ELECTRICAL TIMES

THURSDAY
29 JAN.
1953
NINEPENCE

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* * *

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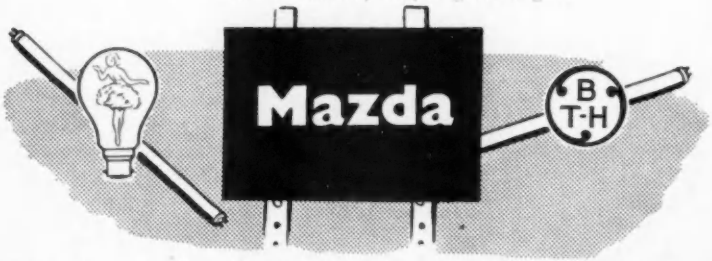
It pays to make your lighting stronger:
Expert examinations show
That Mazda lamps stay brighter longer.



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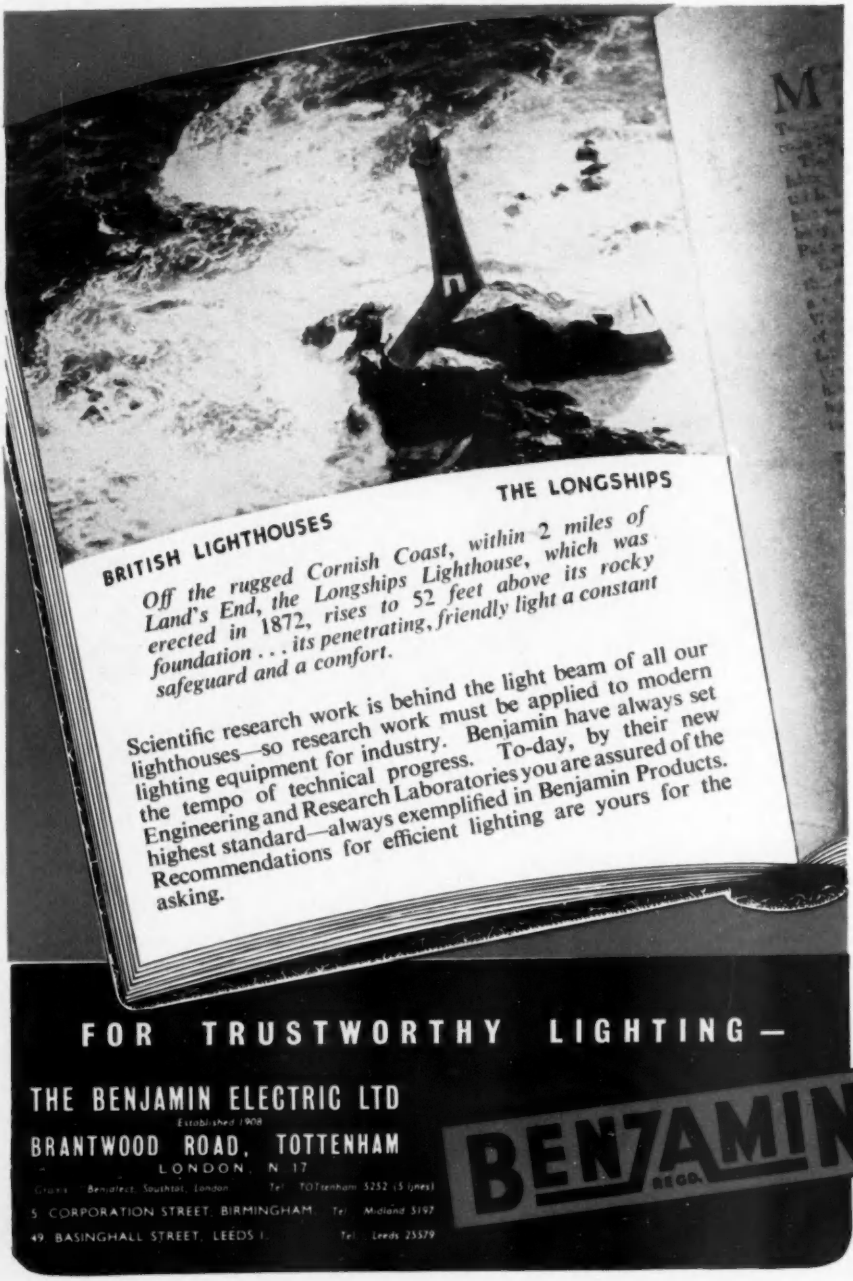
THE BRITISH THOMSON-HOUSTON CO. LTD., Crown House, Aldwych, London, W.C.2 (*Member of the A.E.I. Group of Companies*)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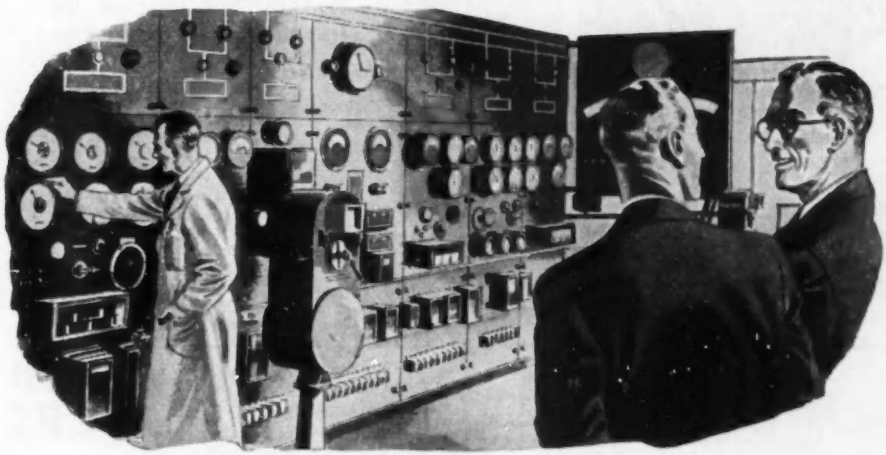

* *These are the actual details of the performance of Nife batteries operated by a Municipal Authority.*

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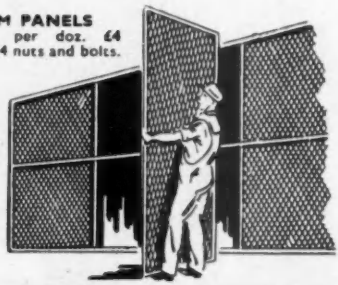

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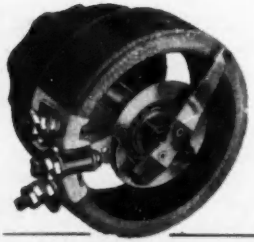

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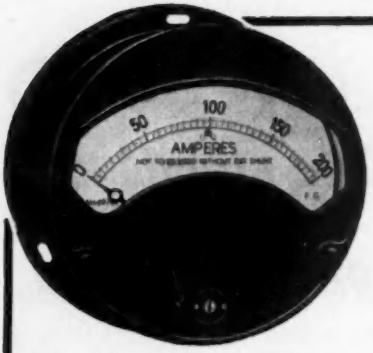

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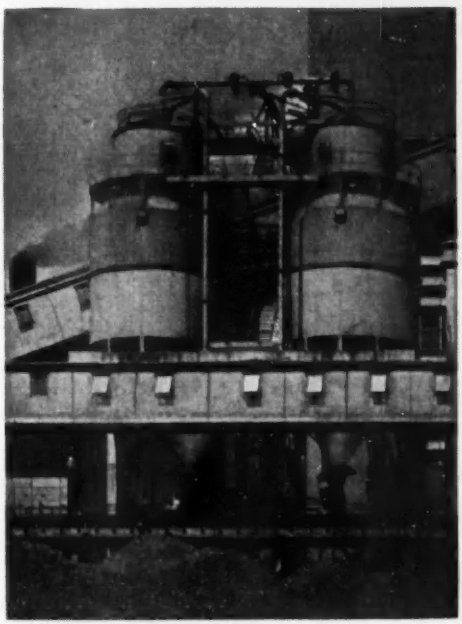

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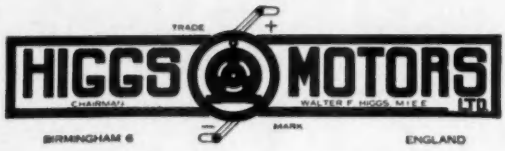

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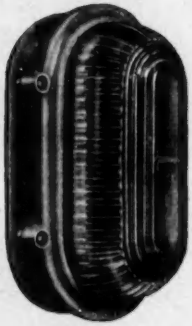
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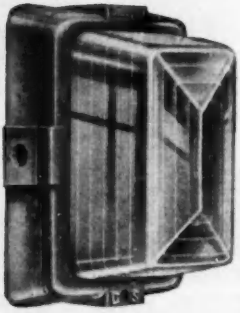
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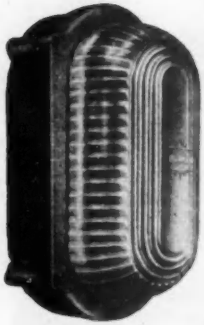
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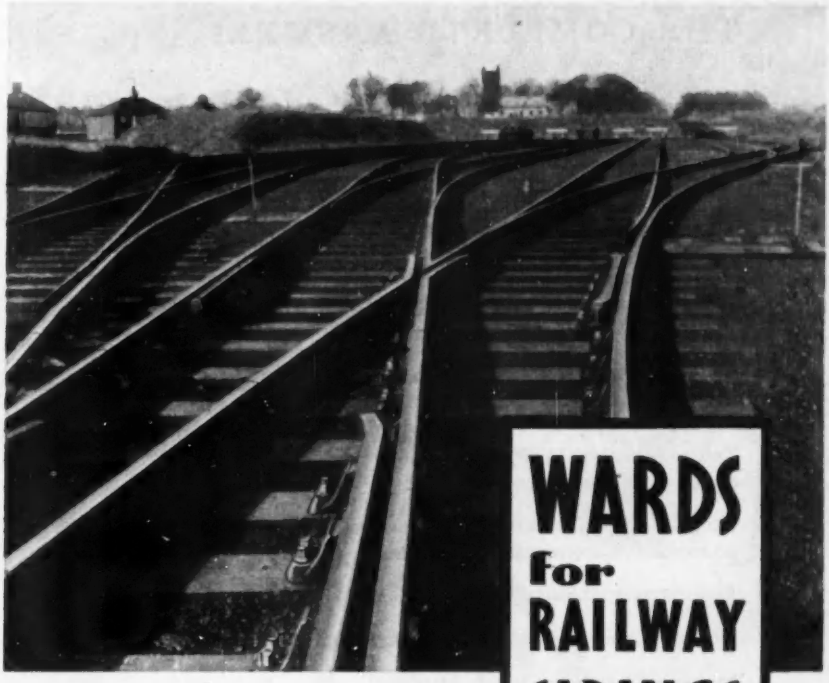

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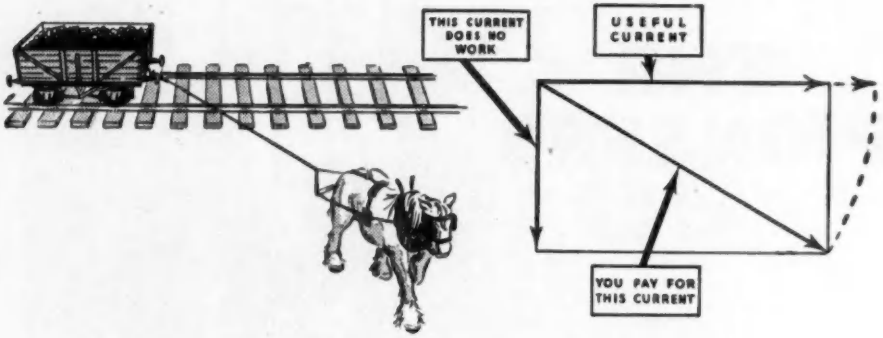

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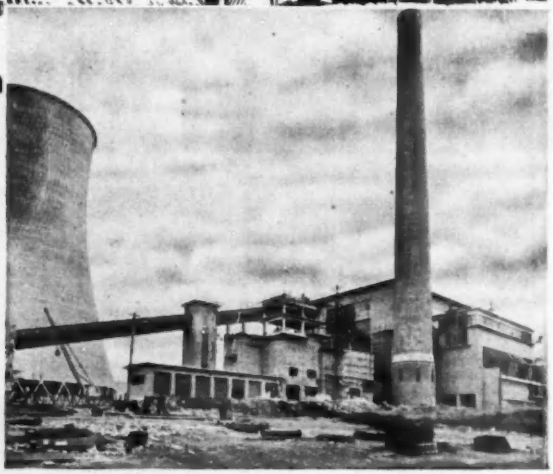

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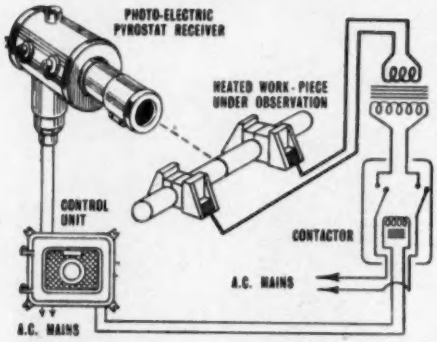

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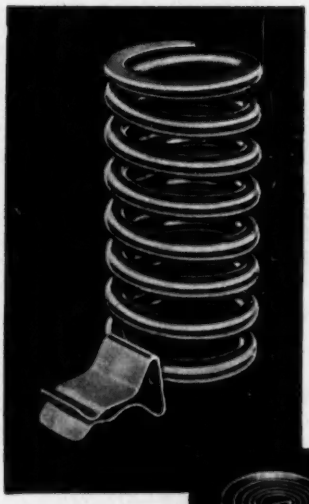

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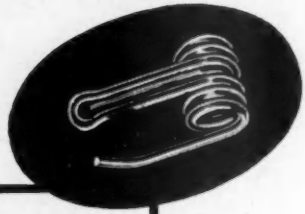

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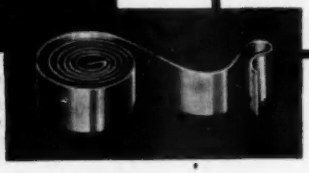

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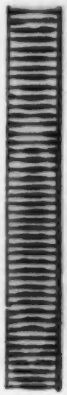

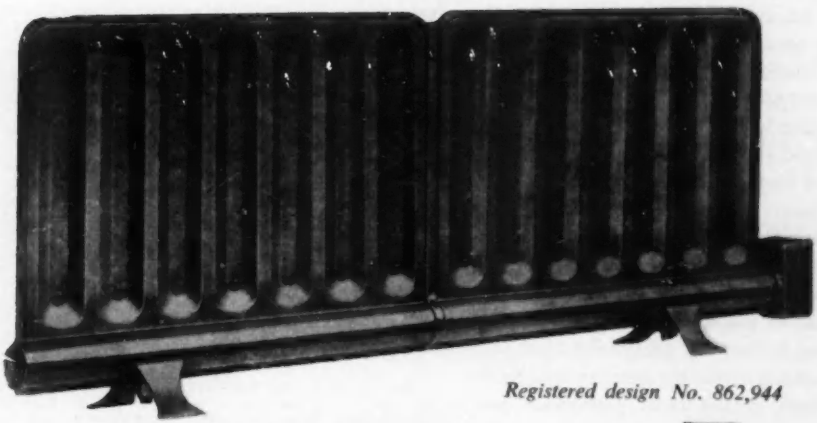

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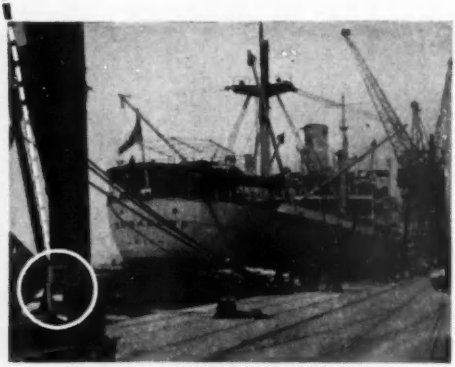

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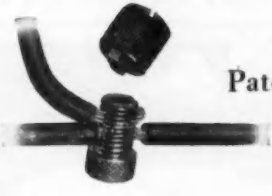

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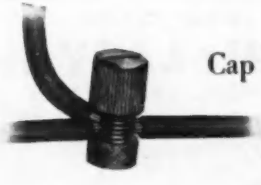

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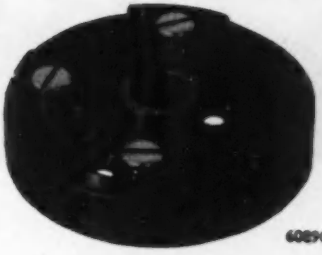

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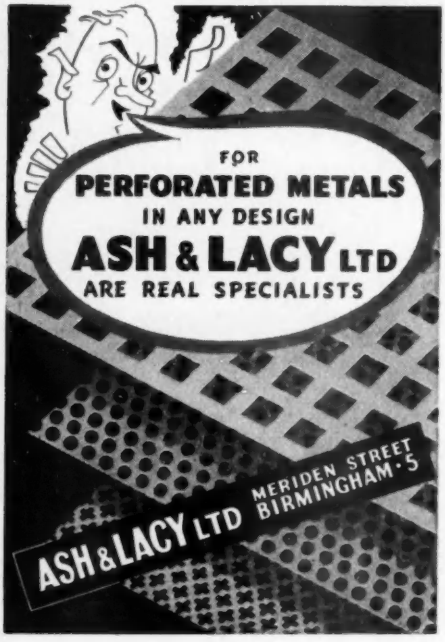

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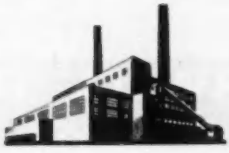

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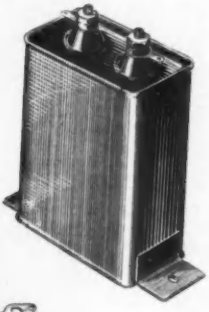

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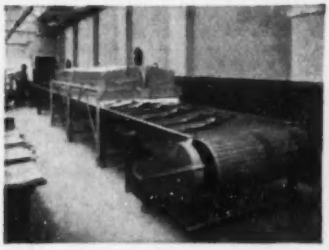

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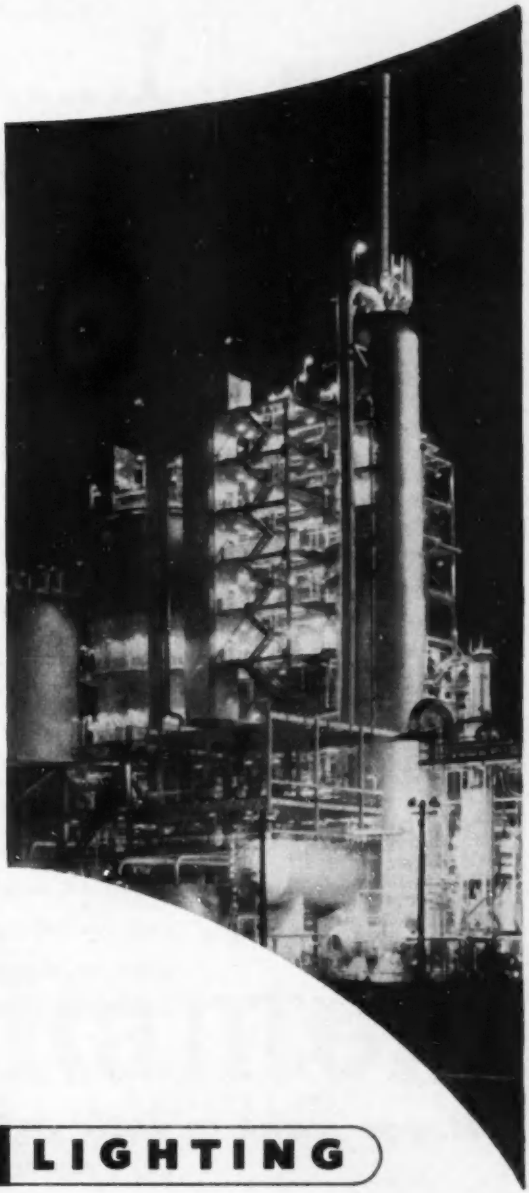

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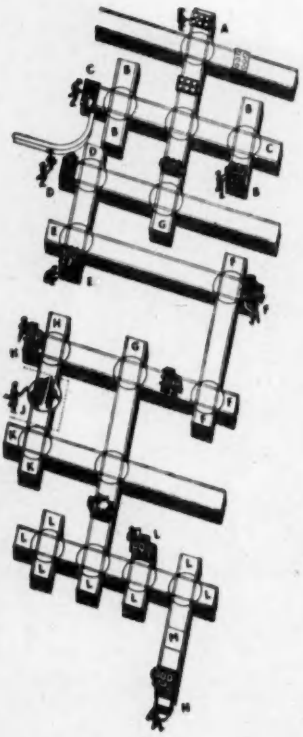

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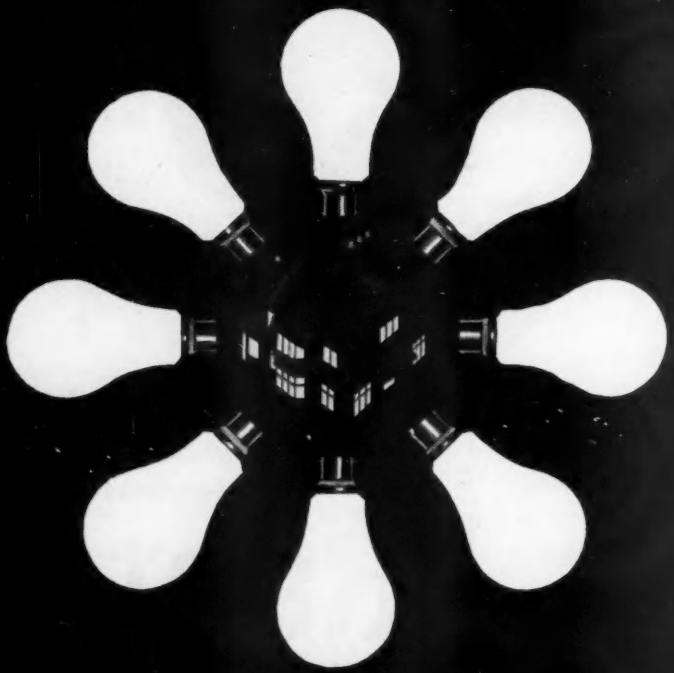

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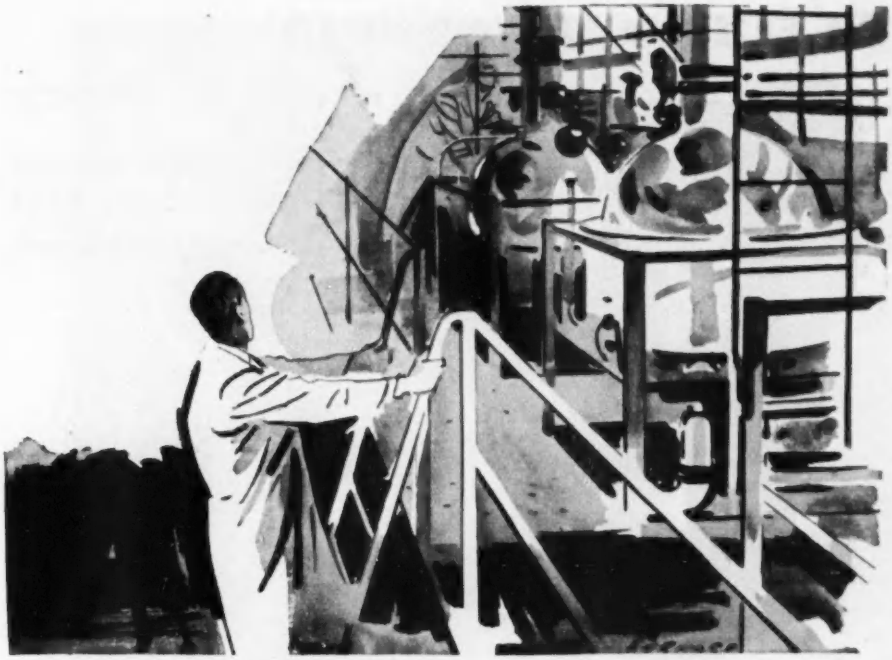

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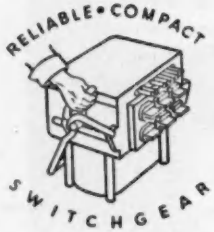

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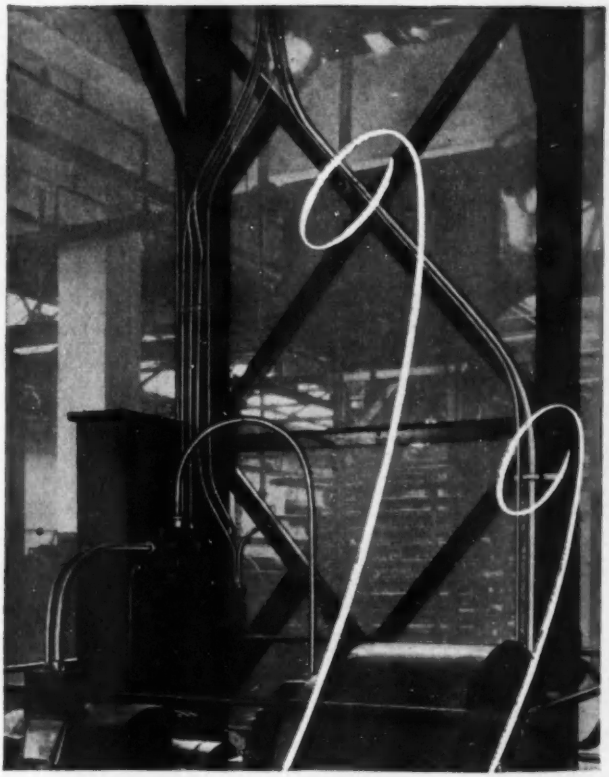

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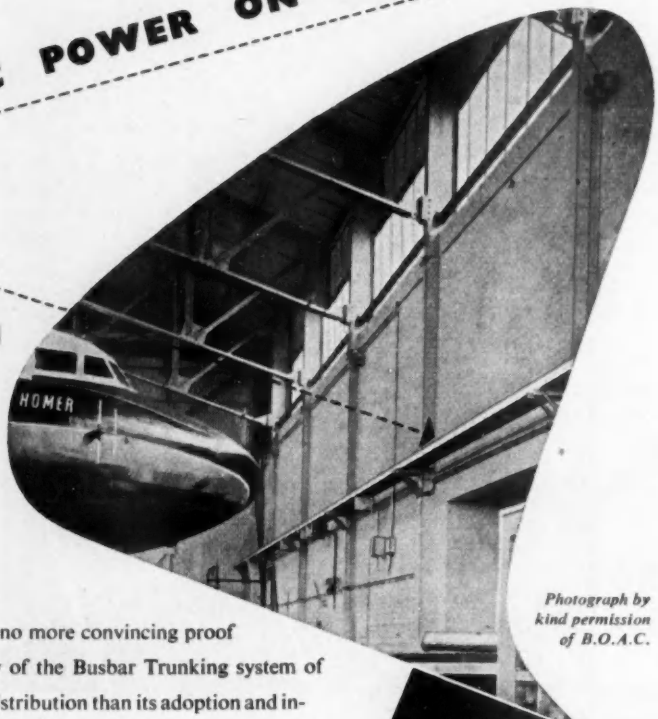

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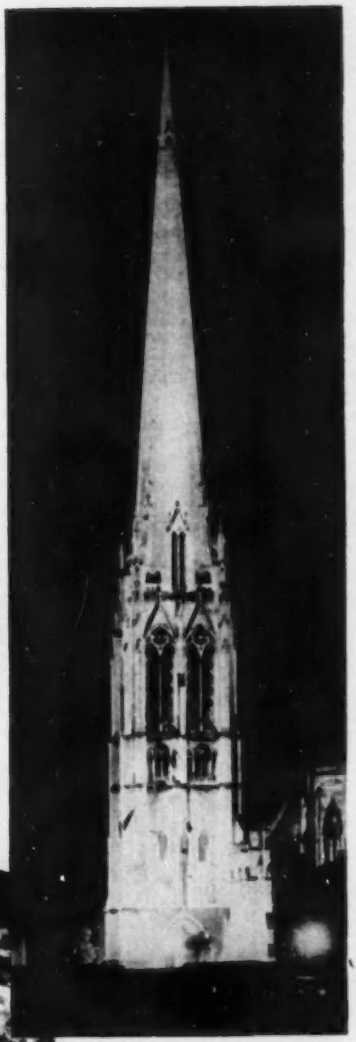

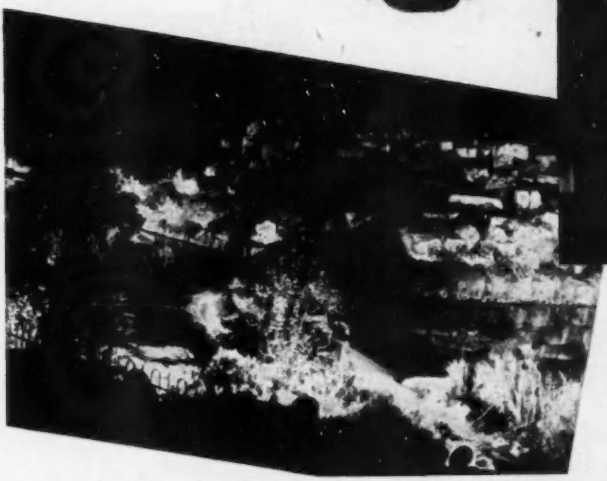

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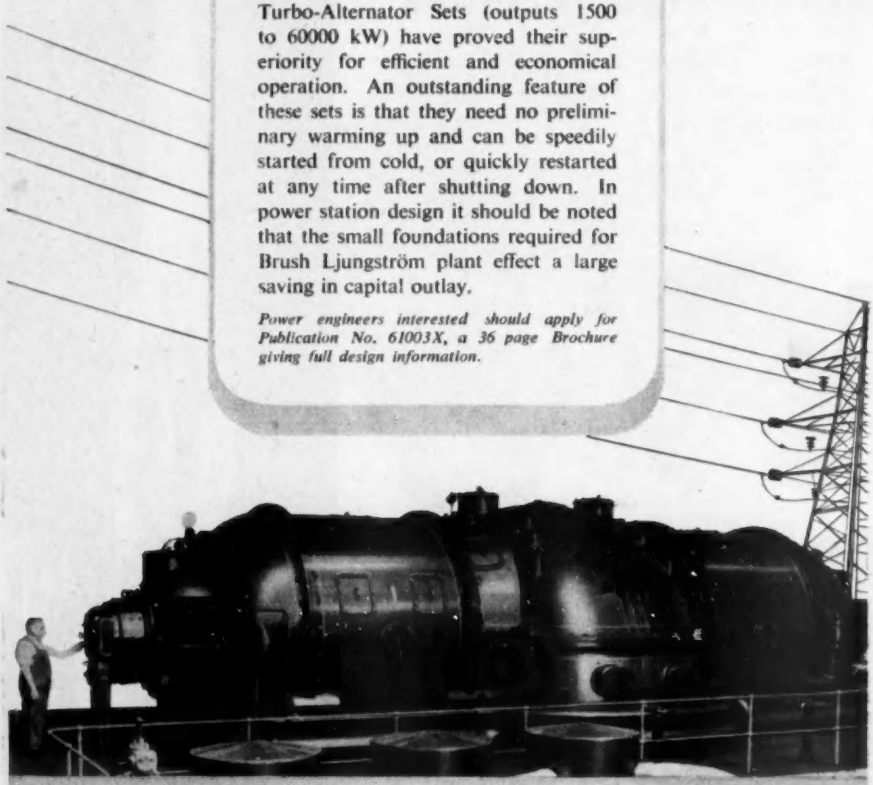

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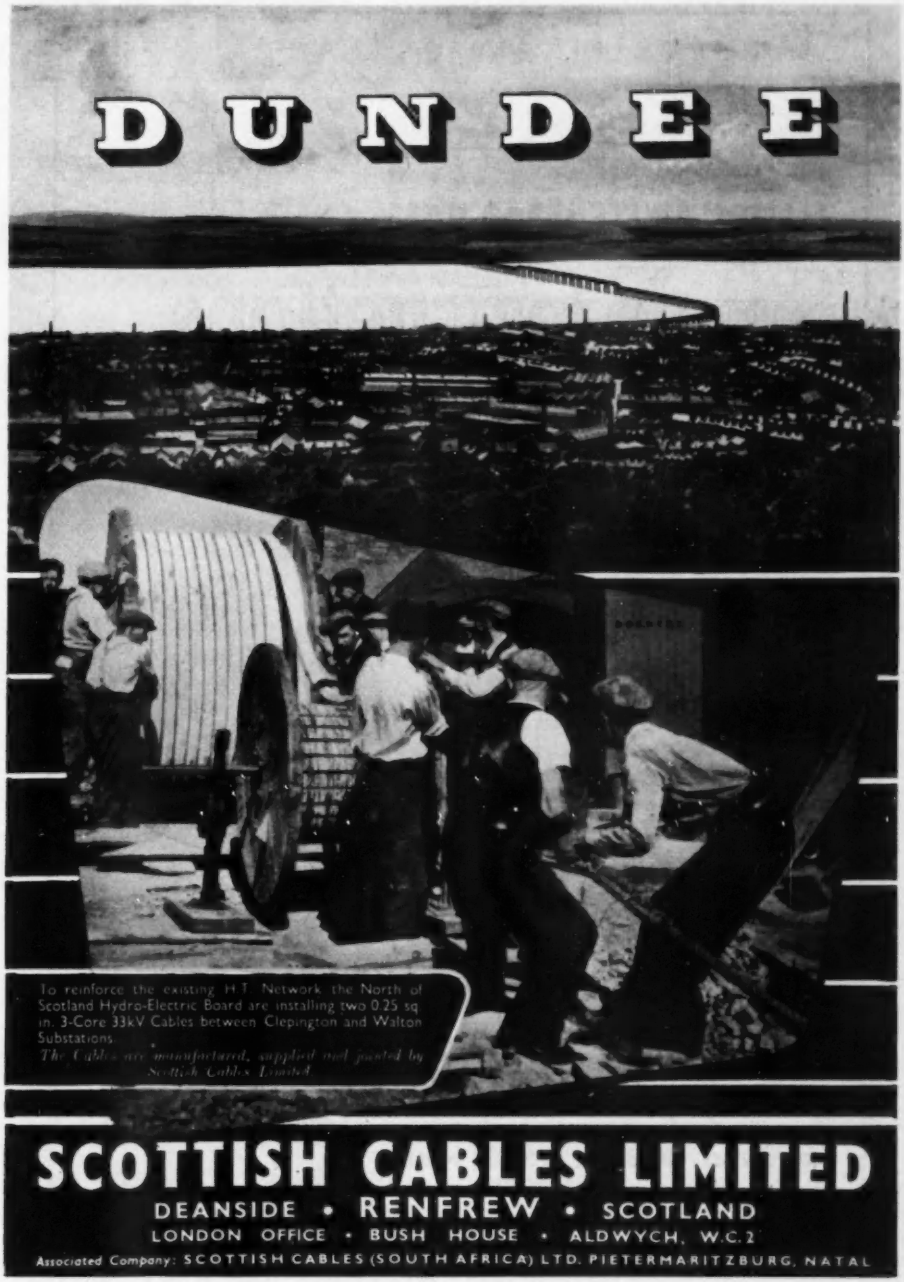
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ELECTRICAL TIMES

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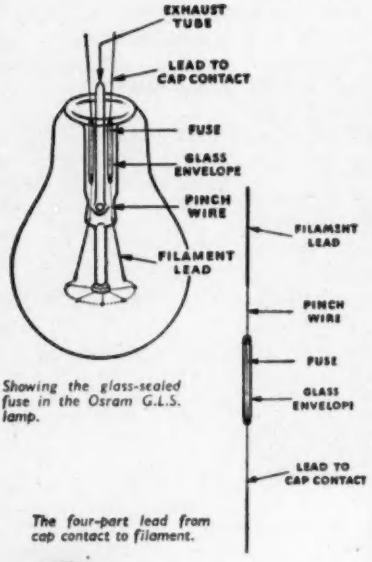

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Editorial

TIME FOR TALKING

SPREAD out once more over five days, the programme for the 1953 British Electrical Power Convention has a more practical appearance than did last year's compacted timetable. In particular, it goes some way to meet the criticism voiced last year, that there was insufficient time given for consideration of the conference papers. The main group of papers this year are allocated two full sessions for presentation and discussion, an improvement which will be welcomed and, it is to be hoped, used to the full. But was it not possible to do better than compress the reading and consideration of three further contributions into one afternoon? Yet although this blemish remains, the programme is a clear advance on that of former years, especially in its concentration on one clear theme: supply to the manufacturing and food-production industries. Moreover, last year's innovation, an electrical "Any Questions" is retained, as expected after its undoubted success, and the Electrical Exhibition makes a return to its rightful place. Of course, there are casualties, notably the illustrated lecture, which may have been abandoned for want of suitable subjects, but on balance this new programme undoubtedly promises success.

JOINT READING AGAIN

JOINT meter reading as a source of economy in the operation of the electricity and gas supply industries is a hare that continues to run well. The Association of Chambers of Commerce, which is pressing on the Government the possibility of savings in the power industries through joint administration in some sectors of activity, has now added its support to this lively idea. In a memorandum sent to Lord Leathers, the Association asks for closer co-ordination of many activities of the gas and electricity boards, but meter reading is the only matter on which a firm recommendation is made. Yet it is admitted in the memorandum that as an isolated measure, such a step might give more trouble than it is worth. The doubt which such half-heartedness invites is deepened by the discovery that figures quoted to support the Association's case are unnecessarily out of date, and that they are presented in disregard of a statement, made in the last B.E.A. report, that many of the expenses noted under the "administrative and general" heading in the Authority's accounts are in fact tied to specific, non-administrative, spending. Perhaps the final contradiction, however, is to be found in the Association's commendable emphasis, that it has no wish to interfere with full and free competition between the electricity and gas industries. Is it really going to be possible to achieve worth while economy without some softening of the sting of competitive selling?

INTERNATIONAL ENGINEERS

IN the long debate on the education and training of engineers that has spanned recent years, there has been continued attention to the content and form of training here and in other countries, but notably less on the point at which that training starts, and the goal to which it leads. It is of particular interest that the professional institutions, as part of an extending programme of international co-operation, have been studying just these points: comparative requirements for the would-be professional engineer at the commencement of his technological education, and the stage in experience at which full professional status is obtained. Already some significant differences in practice are emerging. In contradistinction to the British emphasis on mathematical ability as a basis for engineering studies, the Swiss concentrate more on possession of a good classical education. In Italian law, the graduate is regarded as a

fully qualified engineer, while United States legislation requires the official registration of engineers who undertake the approval of large projects. Information such as this —and much more detail is available—is of the greatest value to forming judgments on those occasions when methods of training successfully employed abroad are suggested for adoption in this country.

ATOM PROGRESS

GENERAL satisfaction must be felt at the encouraging tone of the announcement the Minister of Supply made on Monday about atomic energy for generation purposes. The early building of a power station fuelled by uranium in a slow reactor was advocated in this column only a few weeks ago, and it is to be hoped that the decision to proceed with such an experiment, foreshadowed in the announcement, will be taken at an early date. The advanced state of work on the design of a breeding reactor is still more exciting, for here lies the best hope of a marked economy in the cost of electricity generation, but the difficulties to be overcome are numerous and relatively intransigent. Experience in the handling of radioactive plant gained in a less-economical slow-reactor station may prove of the greatest value in this respect, a fact which supports the decision to proceed with both projects.

EARTHING AND HISTORY

HIGH voltage transmission systems are rarely operated unearthed today. Textbooks dealing with system design give good reason for the neglect of this attractively simple arrangement, which offers the possibility of continuing supply uninterrupted in the case of single phase to earth faults. In brief, the weakness lies in the overvoltages that may be experienced during fault conditions when reliance is placed on stray capacitance for the control of voltage to earth. A recent E.R.A. report, however, has thrown some doubt on this flat condemnation, and goes so far as to suggest that this may be an electrical instance of "give a dog a bad name. . . ." It is suggested that the time when the early long distance high voltage lines, operating unearthed, were experiencing the insulation breakdown troubles which brought the system into disrepute, was a period of great advance in the design and manufacture of all types of insulation. Something of the credit which improved dielectrics earned was in fact given to the earthed systems to which a change was made in an attempt to avoid trouble with overvoltages. In support of this ingenious interpretation of engineering history, it is claimed that experience with such unearthed systems as still exist does not support the expectation of comparatively high failure rates as compared with earthed neutral systems. This does not mean, of course, that the unearthed system is to become suddenly generally acceptable, but it does suggest that its defects have been painted in too sombre colours.

MUCH IN LITTLE

IN both home and factory the fractional horse power motor has become an ever-present servant of modern life. Yet the change has been so gradual that it is only when statistics are presented for study that the magnitude becomes apparent. The final analysis of the electrical engineering industry's output in 1948, which is contained in the latest Census of Production report, provides such an occasion. It is with something of a shock that one finds that 360,000 h.p. of f.h.p. motors were manufactured for sale during the year, with yet an additional 40,000 h.p. incorporated in appliances sold by the industry. These are remarkable aggregates for machines which are so small individually, but the story does not end there. Even more impressive is the increase in output which has taken place since pre-war days. When the census for 1937 was taken, the aggregate horse power of f.h.p. motors shown as manufactured was 85,000. Probably the fractional horse power motor has played a bigger part than any other device in spreading the benefits of electricity as a substitute for manual labour. The figures recorded in the packed columns of the census summary in fact hold the story of a minor modern revolution.

Meteor

RESILIENT MOUNTINGS

Some Methods of Preventing Noise and Vibration in Electrically Driven Plant

By R. H. YOUNG, B.Sc.(Eng.), A.M.I.E.E.
A.M.I.Mech.E., A.M.I.H.V.E.

OPERATION of electrical and mechanical plant is frequently accompanied by noise and vibration which may be detrimental to the comfort and well-being of personnel, or to the satisfactory operation of the plant in question or of other plant nearby. While care in design and manufacture can frequently reduce the inherent noise and vibration levels of plant, troubles may arise due to magnification via the foundations.

It should be noted that noise is itself a result of the higher frequency vibrations being transmitted through an elastic medium and normally communicated to the ear by the air.

These audible vibrations may travel directly from a machine to the ear, in which case attenuation or fall-off in noise is fairly rapid, and may be aided by such sound barriers as walls and floors. Frequently, however, the audible and other vibrations are transmitted and magnified by the foundations of the plant, and may be passed on for some considerable distance by the structure to surfaces in proximity to personnel. These surfaces may in turn transmit the lower frequency vibrations directly to the personnel or the higher frequency and audible vibrations indirectly via the surrounding air.

Frequency Range

Vibrations within the range of 16 cycles to 20,000 cycles per second produce sounds which may be heard by the human ear. The piano is a useful guide to the relationship between frequency and pitch. On a normal keyboard the bottom note (A) corresponds to 26⅔ cycles, middle C to 256 cycles, and the top note (A), to 3,413⅓ cycles per sec. The term "vibration" is commonly used to denote vibrations of low enough frequency to be felt. The top limit of such frequencies is of the order of 50 to 100 c/s and hence there is a considerable overlap between the range of feeling and the range of hearing. This is apparent when listening to the lower notes of an organ.

Machinery noise and vibration are sometimes stated to be the results of impact of solid on solid or of solid on air. The phenomena are better explained as resulting from cyclic distortions and displacements of solids, and successive compressions and expansions of the air (or other similar elastic medium). For example, any out-of-balance in a rotary machine will cause, if of low enough frequency, "vibration," and if of sufficiently high frequency, noise. Out of balance frequencies (corresponding to the number of revolutions per sec.) are, in fact, one of the most common, and frequently the most serious, vibration frequencies met with in practice.

Multi-cylinder piston engines and compressors may, in addition, emit vibrations of frequencies equal to the revolutions per second times the number of power strokes per revolution. These higher frequencies may be transmitted to the foundations due to cyclic distortions of the machine itself and, from the foundation or machine mounting point of view, are not negligible, as is sometimes supposed.

Fans provide a good example of cyclic compression and expansion of the air, and vibrations of frequency corresponding to the number of revolutions per second times the number of blades may predominate, though much higher frequencies due to air turbulence may also be present.

Magnetic hum comes under the heading of cyclic displacement of solids, the solids in this case being represented primarily by the stampings of the core but, in addition, the windings will also tend to vibrate. Even with very tightly clamped stampings or the use of solid iron cores, magnetic hum cannot be entirely suppressed as, apart from possible movements of windings, some audio-frequency vibrations will be generated by cyclic distortions of the iron core.

Since with alternating current plant magnetic hum can be a considerable nuisance, its origin and nature will be examined in detail.

Fig. 1 (a) illustrates the effect on a laminated iron core, at some instant, of an a.c. energised winding. Fig. 1 (b) covers the conditions one quarter of a cycle later when, momentarily, no current is flowing, while Fig. 1 (c) covers the next quarter cycle, or half a cycle after (a). Conditions (a) and (c), though different electromagnetically, are identical mechanically, in both cases the like poles of the individual stampings being repelled from one another. It follows, therefore, that the frequency of vibration is *twice* the fundamental alternating current frequency.

In a similar manner the frequency of vibration of the windings themselves can be shown to be twice the electrical frequency. While tests confirm that the predominant vibration frequency is as stated, small amplitude vibrations of frequency equal to the electrical frequency may also be detected. These vibrations would seem to be due to residual magnetism in some part of the magnetic circuit, and the effect of this is best illustrated by the behaviour of polarised cores such as may be present in machines and other apparatus carrying both a.c. and d.c. windings. Fig. 2 (a), (b) and (c) depicts the conditions over half an electrical cycle. Under conditions (c) a.c. and d.c. windings oppose one another, and it will be obvious that a full electrical cycle will be required before the stampings can complete their full cycle of movement.

Resilient Mounting Theory

The practice of introducing some nominal thickness of resilient material or some chance arrangement of springs under a machine, in the hope that this will satisfactorily prevent vibrations being transmitted to the foundations is bad and may, in fact, lead to aggravation of the trouble.

A proper approach to the problem demands some knowledge of simple harmonic motion. When a mass supported by a spring or other elastic medium is set into vibration it will tend to vibrate in simple harmonic motion and at a "natural" frequency which can be calculated from the formula :—

$$n_n = 3{\cdot}13\sqrt{\frac{1}{\delta}} \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

where n_n = natural frequency (cycles per sec.)
δ = deflection in inches due to the force of gravity on the mass, i.e. due to its weight.

Thus, if on placing a weight on a coil compression spring (or on hanging the weight on a tension spring), the weight compresses (or stretches) the spring by one inch, then from the above formula we find that the weight will tend to vibrate at 3·13 c/s per second. Once initiated, the vibration will persist for a considerable time but damping, due to slight internal friction in the spring material and to air friction, will gradually reduce the amplitude, and after some considerable time the vibrations will cease altogether. If, however, the end of the spring remote from the weight is vibrated at a frequency of 3·13 c/s per sec. and even if the amplitude of this "forced" vibration is quite small, the weight will vibrate with rapidly increasing amplitude until (in theory and neglecting the effect of damping) the distance travelled by the weight becomes infinitely great.

Fig. 1. Magnetic hum produced with a.c. windings alone is of double supply frequency

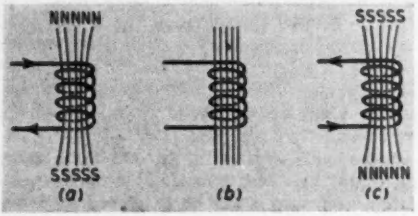
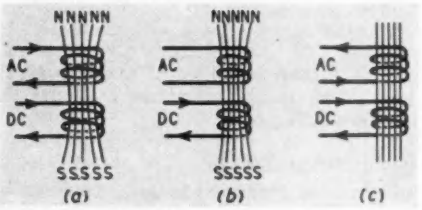


Fig. 2. When polarising windings are used, the magnetic hum frequency may be the same as that of the supply fundamental. This diagram shows the effect over half of one cycle



The danger attending unscientific application of resilient mounting of machinery will at once be apparent. It would, of course, be extremely unlikely for the natural frequency of the mounting to coincide exactly with the forced frequency set up by the machine, but if the two frequencies are somewhat near each other, the amplitude of the vibrations of the machine and the vibrations exerted on the foundations may be considerably magnified.

The ratio of the vibration forces transmitted to the foundations to the vibration forces at source is termed the transmissibility (T). This

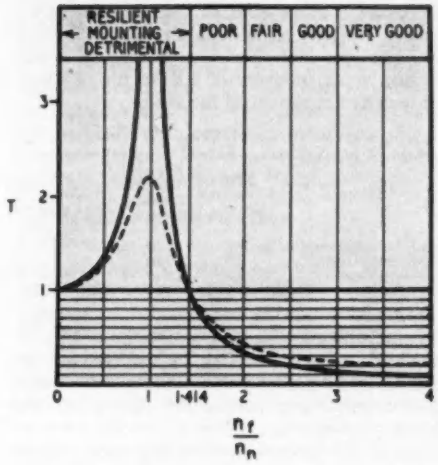


Fig. 3. Transmissibility in terms of the ratio forced to natural vibration frequencies

can be calculated from the formula:—

$$T = \pm \frac{1}{\left(\frac{n_f}{n_n}\right)^2 - 1} \quad \ldots\ldots\ldots\ldots\ldots (2)$$

where n_f = forced frequency generated by the machine

n_n = natural frequency of the mounting.

Fig. 3 is based on this formula and shows that for a perfect spring (no damping) T approaches infinity as the ratio n_f/n_n approaches unity. A second curve (dotted) shows the effect of damping such as might be present in cork and similar resilient materials. It will be seen that damping does harm except over a certain critical range of n_f/n_n which should normally be avoided.

Special attention is drawn to one very significant fact illustrated by the formula and graph. This concerns the typical practical case where more than one vibration frequency has to be dealt with. Such a case might, for example, involve an out-of-balance frequency of 25 c/s and a motor magnetic hum frequency of 100 c/s. If the natural frequency of the mounting is arranged so that the ratio of n_f/n_n gives a reasonably good degree of isolation (or a reasonably low value of T) for the lower (25 cycles) frequency, then the mounting provides extremely good isolation of the higher (100 cycle) frequency.

The general rule, therefore, is to design the mounting suitable for the lowest forced frequency thought to be of importance.

Resilient Mounting Practice

A common practice is to aim at a ratio of n_f/n_n of 3, giving a transmissibility of 12½% (or a percentage isolation of 87½). With low forced frequencies such as may be present with reciprocating compressors, the desired natural frequency of the mounting may be very low indeed and may therefore involve considerable static deflections. Very large deflections are generally best achieved by means of helical springs which should preferably be of extension type, as a base which is "hung" will be less subject to lateral instability.

An example of such a mounting would be a domestic refrigerator compressor unit with single cylinder compressor unit running at, say, 500 r.p.m. The vital forced frequency will be 500/60 c/s (8·33 c/s) and, for a ratio of n_f/n_n of 3, the required natural frequency of the mounting will be 2·77 c/s. From Formula 1, the necessary static deflection is found to be 1·27 inches. If the weight of compressor, motor, drive and base is x lb and this is suspended by four springs, the necessary stiffness of each spring will be $(x/4) \div 1{\cdot}27$ lb/in.

Such a mounting will more than adequately isolate the higher frequencies such as the out-of-balance frequency of the motor (which may run at 1,450 r.p.m. approx.) and the magnetic hum. With regard to the latter, however, it will be appreciated that there will still be some direct air-borne noise, the sup-

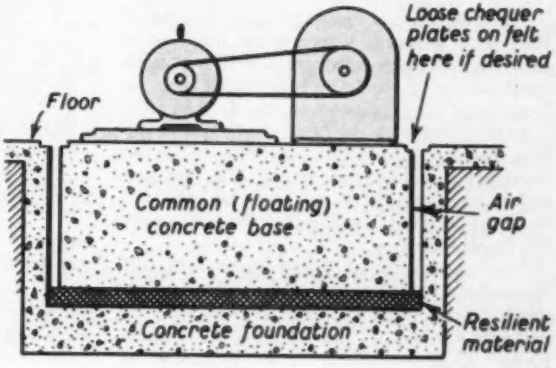


Fig. 4. Method of vibration-insulation for motor-driven machinery

pression of which involves techniques outside the scope of the present article.

For larger plants static deflections of the order of one inch may be out of the question, and it frequently happens that the vibration

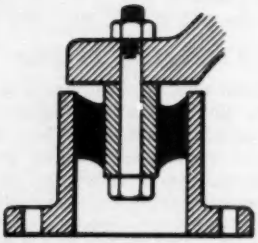


Fig. 5. Typical mounting using rubber under shear stress, small mountings may have the rubber in compression

frequencies to be dealt with are sufficiently high to permit of the comparatively small static deflections obtainable by inserting one or two inches of cork, or similar material, under the base. Cork and corkboard are particularly suitable materials as they can be safely loaded to give static deflections of up to one-tenth of initial thickness without measurable permanent sets and without consolidation causing any very marked change, with passage of time, in the natural frequency of the mounting.

Felt is not an ideal material as it may consolidate to a marked extent. Some special felt-like materials for vibration isolation purposes are marketed and these may be less prone to consolidation, but felts in general are more suited for reducing the transmission of isolated or non-cyclic shocks than for the isolation of continuous vibrations.

Use of Cork

The most general method of applying materials such as cork, where some machine is driven by an electric motor, is to mount both machines on a common base which may be sunk in the floor as shown in Fig. 4. The cork is inserted between the common base and the final concrete foundation. In order to get the necessary loading and hence the required deflection, it may, in certain cases, be necessary to insert strips of cork rather than to cover the whole base area.

The suppliers of cork and corkboards will recommend loadings or state values which must not be exceeded. For each quality of material a value of "unit compliance" will be given. Unit compliance is the deflection in inches of a cubic inch of the material when loaded by 1 lb or, alternately, the deflection in inches per inch thickness of material when loaded at an intensity of 1 lb/sq in. Typical properties are shown in the table.

PROPERTIES OF CORK VIBRATION DAMPING

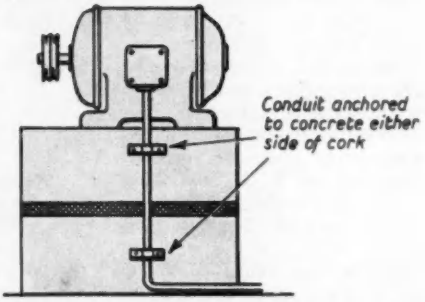
Material	Max. Loading lb/sq in.	Recommended Loading lb/sq in.	Unit Compliance
Light Corkboard ...	8	2 to 4	0·008
Medium Cork ...	25	10 to 20	0·003
Heavy Cork ...	60	20 to 50	0·0017

The deflection in inches will be obtained by multiplying the unit compliance by the thickness of the material (inches) and by the actual loading (lb/sq in.). Though cork and corkboards have measurable damping, the value of deflection (δ) so obtained may be used in Formula 1 to find the approximate natural frequency of the mounting and, provided the ratio n_f/n_n is greater than $\sqrt{2}$ (as it should be), the approximate value of the transmissibility may be taken as given in Formula 2.

Rubber Mountings

For moderately large deflections necessary to cope with rather low frequency vibrations, rubber mountings are frequently used. Rubber, in the strict sense, is incompressible, but is resilient in the sense that it readily flows or distorts under load and recovers its original shape as the load is removed. Rubber behaves like a simple spring, with some damping,

Fig. 6. Vibration can be transmitted across insulation if pipes or conduit act as a bridge



except in one respect, viz. the inertia associated with the distortion and flow under load makes rubber behave under normal vibration frequencies as a much stiffer spring than it would appear to represent when slowly distorted under a static load or weight. Since

rubber is normally used in the form of proprietory mountings, the essential data of which can be supplied by the makers, this property of rubber may not often be of concern to the application engineer. Small rubber mountings for light machinery and instrument work may use rubber in compression, but the more common method is the use of rubber in shear as in the typical mounting shown in Fig. 5.

Special Considerations

On occasion the otherwise satisfactory resilient mounting of some plant has been nullified by the bridging of plant base and sub-base by rigid conduit or pipe connections. Fig. 6 illustrates a case in point. Flexible conduit connections for motors and other electrical plant, and flexible (normally coiled) piping connections to small compressors and pumps, will be necessary. Canvas or similar flexible connections must be used for fans.

When the plant consists of an electric motor, V-belt drive and driven machine, it is usually advisable to introduce a common bedplate or concrete base between the machines and the isolating medium. Such an arrangement will minimise pitching moments and wear on belts.

In certain cases the satisfactory isolation of machine vibration may present considerable difficulty. This is illustrated by the following example.

Example

A single-cylinder compressor is to be driven at 300 r.p.m. by a 720 r.p.m. 50-cycle induction motor. Compressor and motor are to be mounted on a concrete base of dimensions, in plan, 4 ft × 2 ft 3 in. The total weight of compressor, motor and concrete base is 4,000 lb. Consider the effect of introducing light corkboard of unit compliance 0·008 under the concrete base.

Area of base $= 4 \times 2\frac{1}{4} \times 144 = 1{,}295$ sq in.

Loading (assuming corkboard covering base area) $= 4{,}000/1{,}295 = 3{\cdot}09$ lb per sq in. (satisfactory).

Deflection for 2 inch thickness of corkboard, $\delta = 0{\cdot}008 \times 2 \times 3{\cdot}09 = 0{\cdot}0494$ in.

Natural frequency, $n_n = 3{\cdot}13 \sqrt{\frac{1}{0{\cdot}0494}}$

$= 14$ c/s (approx.).

Forced frequency, n_f due to compressor $= 300 \div 60 = 5$ c/s.

$\frac{n_f}{n_n} = 0{\cdot}37$ approx. ∴ Transmissibility is greater than unity and the resilient mounting is doing more harm than good. Forced frequency, n_f, due to out-of-balance of motor $= 720 \div 60 = 12$ c.p.s. ∴ Transmissibility for this frequency is much increased and the resilient mounting may magnify vibrations which might otherwise have been undetected.

For magnetic hum, the ratio $\frac{n_f}{n_n} = \frac{100}{14} = 7$ approx. ∴ the degree of isolation for this is very good.

The choice of one inch thickness of corkboard gives an alternative natural frequency of 19·5 c.p.s. approx., and the following approximate ratios of n_f/n_n:—

Compressor	0·25
Motor (o.o.b)	0·60
Magnetic hum	5·0

While the transmission of both compressor and motor out-of-balance vibrations would be increased slightly, the use of one inch of corkboard might be regarded as justified on account of the degree of suppression of magnetic hum.

In the actual case on which the example was based, it was decided that the low frequency compressor vibrations were of more importance than the magnetic hum, and the resilient mounting was omitted altogether. However, the concrete base was taken down to sub-soil level and was not in direct contact with the (concrete) floor. An additional consideration was that the rigidity and stability of the mounting so obtained was an advantage in view of the heavy pipe connections to the compressor.

ELECTRICITY SUPPLY, 1948

CENSUS of production reports for the year 1948 are now appearing, and amongst them is one for the electricity supply industry. As April 1, 1948, was vesting day under the nationalisation act, some considerable complication has ensued. In general, however, the report merely records statistics already supplied in annual reports and in returns published by the Ministry of Fuel and Power.

Gross output for the year was valued at £241·4m, and with the cost of materials and fuel used put at £105·5m, the net output of the industry in 1948 is estimated as £135·9m. A total of 151,971 people were employed on average during the year, and their wages and salaries totalled £52·8m. The net output per person employed thus works out at £894.

Comparative figures for the previous census, that of 1935, give £86·8m as the gross output and £23·7m as the net output. There were then 102,928 people employed, so that the comparative net output was £613.

The report is published by H.M.S.O. as Volume 12, Trade G, of the 1948 Census, price 3s.

International Ideas on Training

LATEST successful activity of E.U.S.E.C.—the Conference of Representatives of the Engineering Societies of Western Europe and the United States—has been a conference on the education and training of professional engineers. This has already been briefly noted in these pages, but additional information has now become available about the proceedings of the conference, which met in London from January 12 to 17.

Scholastic Standard

So far as the scholastic standard necessary at school-leaving is concerned, it was found that there are three distinct ideas as to the requirements of the would-be professional engineer. In this country and France, a high standard of mathematics is required, whereas Switzerland place a much greater emphasis on the need for a good classical education. Other countries adopted an intermediate attitude.

There is considerable divergence of practice as to the means of achieving that broadening of the student engineer's mind, which all agreed to be desirable. The one factor found to be fairly general was the compulsory study of economics, law, and management.

Considerable discussion took place about the necessary practical training for the engineer. While methods varied, it is apparent that no country wishes to produce a ready-made engineering graduate ready to take on a responsible position in industry on leaving the university. The moment in his career when an engineer can be regarded as a fully qualified professional man was also discussed at some length. In this respect many countries (including the United States) differ from Great Britain. While they have no legal requirement for the qualification of an engineer in a subordinate position, the man who has to approve engineering projects must be registered by the law of the country.

It was recommended at the end of the conference that a similar meeting should be held in 1954. This would undertake the preparation of a glossary of terms used in engineering education and training, and would consider the setting up of a permanent conference on engineering education and training.

B.E.P.C. Arrangements for 1953

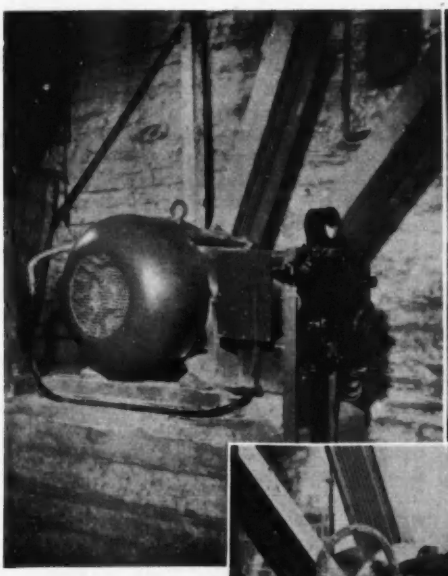
AS announced some time ago, the 1953 British Electrical Power Convention is to be held at Torquay from June 8 to 12. All business meetings are to be held in The Pavilion while the Electrical Exhibition is to be staged at Torwood Garage, Torwood Road.

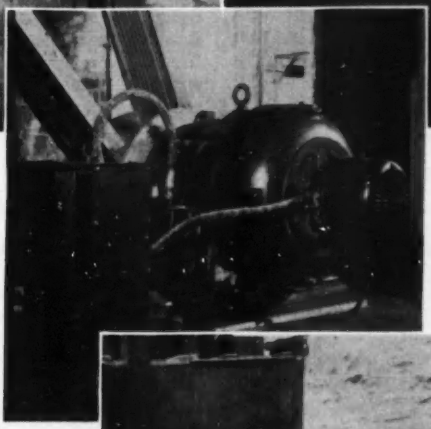
The programme as at present arranged is:

MON., JUNE 8	
8.30 p.m.	Official opening of Electrical Exhibition, Torwood Garage, Torwood Road.
TUES., JUNE 9	
10 a.m.	Opening of Convention. Civic welcome. Presidential address by Sir John Hacking.
2.30 p.m.	Sir Henry Self: "Electricity and National Prosperity."
3 p.m.	Ladies Tea, Imperial Hotel, to meet Lady Hacking.
8 p.m.	Joint Reception, Town Hall, Major and Mayoress of Torquay and Sir John and Lady Hacking.
WED., JUNE 10	
10 a.m.	Col. B. H. Leeson (B.E.A.M.A.) and Mr. E. R. Wilkinson (B.E.A.): "Electricity and Industrial Production." A. O. Johnson (N.W.E.B.) and C. P. Holder (Metropolitan-Vickers): "Electricity Supplies for Industry." H. G. Prosser (B.E.A.) and A. W. Pedder (Merz and McLellan): "Combined Electricity and Heat Supplies." T. B. Rolls (McLellan and Partners): "Industrial Applications of Electricity."
12.30 p.m.	E.A.W. Luncheon: The Ballroom.
2.15 p.m.	Cruise to River Dart. No business session.
THURS., JUNE 11	
10 a.m.	Continuation of Wednesday morning session.
2.30 p.m.	S. F. Steward (S.W.E.B.): "Electricity and Food Production." C. A. Cameron Brown (B.E.A.): "Electricity in Agriculture." A. W. Gray (B.E.A.): "Electricity for Horticulture." F. E. Rowland (Inst. Brit. Agricultural Engineers): "Electrical Equipment for Food Production."
7.30 p.m.	Annual dinner, Imperial Hotel.
FRI., JUNE 12	
10 a.m.	Electrical Forum.
11.30 a.m.	Annual General Meeting.

Motors in Milling

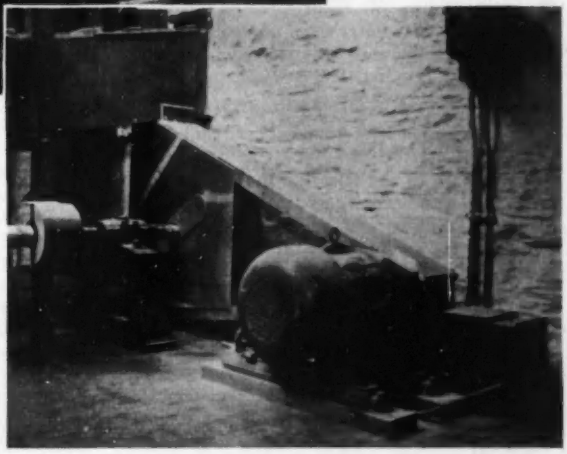
ELECTRIC DRIVES FOR AUTOMATIC WHEAT GRINDING





Many different types of Brook Motors machine have been used in the newly carried out modernisation of the Brighouse, Yorkshire, flour mills of Thomas Sugden and Sons. Top left is seen a motor which pumps 1800 g.p.m. from an artesian well for washing the wheat. On the right is a 70 h.p. totally enclosed fan-cooled motor which drives the automatically controlled flour milling plant. Finally, bottom right, comes another typical application, a 7·5 h.p. motor driving one of the conveyors used in the mill. In addition, there is an 80 h.p. fan-cooled slip-ring motor which drives a group of 15 break rolls. Later in the process, f.h.p. motors are used to power the opening of paper bags ready for the filling machine. Precise sequence control is necessary throughout the mill, so all motor controllers are sequence interlocked

Above is seen one of the main mill control panels which make use of Allen West gear. Electrical distribution is at 400 V, 50 c/s, 3-phase, with a 750 amp air c.b. controlling the supply



Our readers' views . . .

Suppression and Performance

IT has been established in the technical literature on the subject, that the effect of fitting radio-interference suppressors to the ignition systems of motor cars varies with engines of different design. Consequently, the experiences of motorists who have fitted suppressors are useful to others only if the make and model of engine are revealed.

During the past few years I have experimented with standard suppressors on three different Austin engines, namely 1947 12 h.p., 1948 16 h.p. and the current A.70 engines. In each case my impression is quite definitely that starting from cold is improved when the suppressors are fitted to the distributor head. In no case could I detect any deterioration in engine performance. The effect on my own television receiver was very marked in all cases. All these tests were purely subjective, but that is, after all, what really matters to the motorist and to the viewer.

J. F. Stanley

THORNTON HEATH

MR. BARTLETT gives some interesting personal experiences with his suppressed engine. Other than to say that it would be a phenomenon indeed if my own car ever reached the speeds quoted (being a vintage type) I have never noticed any alteration in performance at sedate speeds with a suppressor fitted. Although not a performance matter I would mention my doubts about the reliability of some of the suppressors on sale. Over a period of fifteen years I never had a breakdown or stoppage due to a faulty electrical fitting. After fitting a suppressor in the H.T. lead I have had three stoppages in three years, all, of course, at most inconvenient times. The first instance I spent considerable time tracing the trouble, but with the knowledge so gained I was able easily to trace the next two, and all were cured by throwing the suppressor into the ditch and proceeding without one. I have heard of similar experiences from other motoring friends, so it appears that failure of the little suppressor can be added to the large list of troubles which can happen to the motor car.

HAYLING ISLAND *H. J. Long*

MAKING DOME REFLECTORS

AS part of the exchange of technical information between this country and the United States, a report has now been issued by the U.S. Department of Labour on the production of Dome Reflectors for electric lamps. This is available in this country from the British Institute of Management, Management House, 8 Hill Street, London W.1, price 5s.

Five selected plants engaged in this type of work in America have been selected and their production methods analysed and compared. The highlight of the report is that by the use of special purpose equipment, mechanised materials handling and an efficient plant layout, one of these manufacturers can produce a standard pattern dome reflector in less than seven man-minutes.

A new method of drawing the reflector on a press, in the same manner as that used for the production of motor car fenders, has replaced spinning the reflector in a lathe. As the diameter of the cylindrical neck of the reflectors is constant, the necks can be produced in large quantities and cut to the desired length to fit many different models.

Reduction in labour time has been effected by the use of specialised machinery and equipment, such as conveyor belt operated enamelling furnaces, automatic pickling washers, streamlined enamel spray booths and new types of draw presses. A continuous chain conveyor carries the reflectors from the metal forming department, through the pickling washer, enamelling furnace, spray booths and dryers to the packing department.

The report itself consists of three parts. The first section describes the general production practices in terms of the product, processes and manhour requirements in each of the five selected plants. Important factors conducive to high productivity are also noted.

In Part II, detailed technical information is given on the characteristics of these plants and includes an analysis of manhour requirements per 100 reflectors in each department. Part III contains general information and the economic background of the industry.

MAGNESIUM

—A METAL WITH USEFUL ELECTRICAL PROPERTIES

By WORKS ENGINEER

MATERIALS, in which lightness is coupled to electrical efficiency, are coming in for more and more attention by those responsible for design and specification of electrical products. In the front rank of such materials are the lightweight metals; aluminium, magnesium, beryllium.

Light Metals

In the three score years that have passed since it first became a commercial commodity, aluminium has taken its place by the side of copper in point of importance to the electrical manufacturer. During the seven years since the second world war, the electric cable industry has been pressing vigorously the development of techniques whereby aluminium can take the traditional place of lead sheathing.

Magnesium, about one-third lighter than aluminium has been commercially developed during the last 15 years in this country, that is about a quarter of the time aluminium has been on the market. Beryllium the third of the trio, is still in the development stage and is being sold now at high prices, but even used in experimental quantities, the data concerning it is sufficient to ensure that it now has a place amongst electrical materials of the not too distant future.

Magnesium does not occur as a metal. It exists abundantly in combination with other materials and constitutes 20% of the earth's crust. The source of metallic magnesium is either calcined magnesite (magnesium carbonate) or magnesium chloride. This latter is the crystallised product of a salt brine which is pumped from wells 1,200 to 1,400 ft deep. Whether the basic material is obtained by calcining of the magnesium carbonate, or by the chloride process, the metal is obtained by electrolytic operation.

Characteristics

The characteristics of the basic metal magnesium, as well as the methods used, are reminiscent of those used to obtain aluminium which does not occur in nature, and, is obtained commercially from bauxite by electrilytic reduction in a similarly circuitous way, as is magnesium metal from the carbonate or chloride.

Pure magnesium is used principally as a deoxidiser for other metals or for alloying purposes. There are however special uses for which ingot metal ranging in purity from 99% to 99·9% is employed. In ribbon and wire form magnesium is used to degasify radio and other vacuum tubes. Considerable amounts of magnesium are used in the form of ribbon, in the manufacture of magnesium oxide coatings of high thermal, but low electrical, conductivity, by winding magnesium ribbon spirally on an electric resistor element and subsequently treating it under steam pressure. Also relatively large quantities are consumed in the formation of protective and insulating coating on the surface of certain conductors. These conductors are enveloped in a film of magnesium ribbon, the original magnesium being completely used up in oxidation.

Magnesium Base Alloys

Where light weight and electrical efficiency must be supplemented by mechanical strength magnesium base alloys offer a wider range of usefulness than does pure magnesium and it is in this direction that electrical consumption is most likely to show the greatest growth over the next few years.

The association of aluminium with magnesium is emphasised in the many magnesium based alloys which, because of their advantageous structural as well as electrical properties are attracting more and more attention. The aluminium content of these alloys ranges from 2 to 12%. Adding aluminium up to 4% of the magnesium results in an all-round improvement of tensile strength/elongation and hardness. Addition of greater percentage of aluminium tends to improve one or two of the above properties at the expense of the others. The addition of small quantities of manganese and different methods of heat treatment make these magnesium alloys suitable for a varied and extensive range of application.

Magnesium alloys may be cast, forged, rolled, extruded, and hot worked in numerous ways. Magnesium foundry practice calls for

Mg %	Al %	Manganese	Elongation	Remarks
91·8%	8%	0·02%	2 to 6%	Max tensile strength
91·8%	2%	0·2%+4% Cu. +2% cadmium		Pistons and parts of high thermal conductivity
98·5%	—	1·5%		Resistant to corrosion

special protection from surface oxidation and deleterious action of the gases of combustion. A relatively large amount of flux is used, ranging from 30% to 40% of the charge. Special precautions to prevent shrinkage and porosity consist of abundant risers and perforated skimming gates, etc.

Magnesium alloy castings call for specially designed patterns which take into account the peculiarities of the metal. Where light and heavy sections adjoin larger fillets and thicker webs make for economy and improved quality. It is recommended that magnesium alloy castings have $\frac{1}{24}$ in. per foot shrinkage.

The table alongside gives specifications for various jobs where magnesium is of service.

Cast pure magnesium has a relative conductivity equal to 35% of that of copper and a specific resistance of 4·53 microhms/cm³ compared with 1·59 microhms/cm³ for copper, and the various alloys have lower relative conductivity and higher specific resistance than pure magnesium.

Mines Safety Research

—Intrinsically Safe Apparatus Further Developed

ELECTRICAL topics are again prominent in the thirtieth Report on Safety in Mines Research, which has recently been published by the Stationery Office. An interesting example of the unusual type of problem that sometimes has to be considered relates to compressed-air stemmers. It had been suggested in France that investigations were proceeding into the possibility of such a machine having caused the premature explosion of a loaded shot hole by means of an electrostatic charge generated during stemming.

Experiments made in this country have shown that the risk of exploding a low-tension detonation due to this cause is negligible, and that there is only a very small risk of igniting firedamp. None the less, it is considered worth while as a guard against freak conditions to insist on the electrical earthing of the stemmer. Antistatic hose is recommended as the best way of making the earth connection.

Intrinsic Safety

Considerable progress was made during the year in researches into intrinsically safe electrical circuits and apparatus. It was found that some contact metals, notably magnesium, give abnormally incendive sparking when breaking circuits, and the use of such metals should be avoided where an ignition hazard exists.

The possibility of using battery-operated portable instruments has led to an extension of the work on ignition from sparks in circuits of negligible inductance. It has been found that many dry types of battery, because of their high internal resistance, are in fact intrinsically safe. Where this is not so, a limiting resistance has to be incorporated into the battery unit.

In connection with the widespread use of intrinsically safe electrical equipment in mines, it is reassuring to note that during the examination of a number of items of electrical equipment impounded by H.M. Inspectors of Mines, no intrinsically safe apparatus has been found to be in an effectively unsafe condition. In particular, over many years of examinations, no instance has been found where the safety of this type of equipment has been impaired by long service.

Flameproof Equipment

Particular attention was given during 1951 to the study of Perspex as a substitute for glass in flameproof lighting fittings. The particular point of attention was the bursting pressure of Perspex domes and tubes when subjected to internal explosions. Guncotton yarn had to be used to burst the Perspex vessels, as the pressure required was higher than could be conveniently obtained by the use of a gas mixture alone.

Pressure piling in large flameproof motors was another subject of electrical importance which was closely studied. In this type of motor there is internal circulation of the enclosed atmosphere for cooling purposes, and when ignition occurs at one end, pressure piling occurs in the other, being more pronounced if the motor is running. The experiments were conducted with an 800 h.p. motor, and with the motor running at full speed, pressures as high as 280 lb/sq in. were recorded with a pentane-air mixture.

From AN ENGINEER'S NOTEBOOK

ALTHOUGH one of the earliest of domestic electrical appliances was a house fly electrocuter, the lethal properties of electricity have never really been successfully exploited, save perhaps for one important exception. Therefore, as one who is always spending money on insecticides for my modest garden, I welcome the report of successful trials in the use of electricity for destroying agricultural pests. The victim in this case is a type of eelworm which is particularly destructive of tobacco plants. Satisfactory results are said to have been obtained with electrical pulses of the order of 250 per sec. The source of supply used in the field trials was an induction coil of 2000/1 ratio, fed at 45 V d.c. by a ½kW generator through a commutator to give the necessary interruptions, the frequency of which was adjustable. The output of the coil was fed, I understand, to two insulated steel discs which formed the electrodes and these were drawn across the field by a tractor at a speed of some 4 m.p.h. With 3 ft spacing between the electrode discs it is reported that satisfactory extermination was obtained on damp soil to a depth of 2 ft. This technique, therefore, offers a new approach to the control of this intractable pest for which there is at present no other satisfactory method available. Whether it is equally satisfactory with other soil pests is not clear, but it would seem to be worth a trial.

* * *

IN the relatively short history of electricity supply the various suggested methods of electricity distribution must approach in number the possible permutations of a football coupon. Neither have the possibilities yet been exhausted, for an idea, which is new to me, of obtaining a 3-phase supply from two-wire transmission has recently been put forward in New South Wales. There is little doubt that it owes its origin to the preoccupation of the supply authorities in that part with balancing of load, for even domestic consumers with modest consumptions are required to balance their load across two or three phases. In rural areas, however, economics is the bar to this fetish of load balancing, and so this new distribution system is put forward in order to place the onus of balancing loads on the farmer equally with the city dweller. Briefly, the scheme utilises two phases of an earthed star system at the sending end to feed the two transmission lines, while at the load end a transformer, with a closed tertiary winding to balance the fluxes, gives a 3-phase 4-wire low voltage output from the secondary. Thus the system resembles 2-phase transmission with the phases 120° apart and the earth as a neutral. I am not sure that this system will in practice improve the overall balance. What most engineers will dislike, however, is the use of the earth as a neutral carrying the resultant current. I do not know the soil characteristics in New South Wales, but in some parts of this country the cost of establishing earths satisfactory to deal with these substantial currents will far outweigh the costs of stringing a third conductor. As for the P.M.G., I can only assume that "down under" they don't suffer so much from his activities as we do.

* * *

SO much progress has been made with the germanium triode, the crystal with a second cat's-whisker, that it seems to me the time is approaching when we shall be seeing them in the commercial field. A wide range of equipment has been built incorporating this germanium triode in place of valves, the most spectacular being a battery-operated televison receiver without a single valve. Their miniature size and the absence of a l.v. battery falls admirably in line with the current trend towards ever smaller equipment, an indication of which is shown by the development of a complete audio amplifier little larger than a match box. Further, the recent production of a crystal tetrode suggests development along the parallel lines of multi-grid valves. One thing is clear, however, crystal triodes have inherent limitations which will prevent them replacing valves for many purposes, but their ability to provide robust amplifiers will prove a boon in industrial electronics and should offer a stimulus at a time when it is greatly needed. Particularly will this be so if the newer p - n type crystal triodes fulfil their present promise. These are constructed with differential layers instead of the point contact of the cat's-whisker and in consequence they are more robust and capable of handling much larger currents.—*E.R.G.*

MACHINE TOOLS IN AMERICA

Influence of Electrical Standards on Design discussed in latest Productivity Team Report

ELECTRICAL standards for American machine tools have exerted considerable influence on their design, notably in the provision for control equipment, as shown in the Productivity Team report issued this week. Although the report's consideration of the electrical equipment of metalworking machine tools forms but a fragment of the whole, their discussion shows that in the main, little difference exists between English and American practice in this field of engineering.

Standards' Influence

Two sets of electrical standards exist in America for machine tools, one defined as applicable to the industry in general, the other as laid down by Joint Industry Conference standards. It is the report requirements of the latter which have, or will have, considerable influence on design, presumably not only in America, but in this country, were they to be adopted, but the report does not make this clear. The specifications state that all control devices shall be mounted in one enclosure, which is to be not less than two feet above floor level. Moreover, all control equipment is required to be mounted in a rigid, readily accessible manner in a reasonably dry and clean position. These specifications assist both maintenance and installation, and contribute less to the total cost of the machine than the practice of "building in" control equipment for the sake of preserving an attractive appearance.

Other parts of these J.I.C. standards limit control circuit voltage to 115 V, exclude direct-on-line starters of the thermal overload protection type and specify diaphragm protected push buttons. Although these would have but a secondary influence on machine design, their adoption might add slightly to the total cost of the electrical equipment.

Motor Requirements

The same standards specify that motors are to conform with N.E.M.A. requirements, in which, for a given horse power rating, frame sizes are one size larger than current U.K. dimensions, resulting in high mounting costs for large motors. Moreover, if motors are to be mounted within the body of the machine, the compartment specification requires that accommodation shall be provided for a motor one frame size larger than that to be used, and its terminal box. The extra cost accrued in meeting these requirements is considerable, with the result that motors are more often mounted outside the machines. Rotor and stator units are used only where the standard motor is entirely impracticable. On the other hand, standardisation of motor sizes is estimated to be of no mean value to the American industry as a whole. Each specification, however, contains a clause allowing deviations mutually agreed by vendor and purchaser. If used sensibly this clause can ensure that no anomalies will result from irrational application of specifications and hence provides the means to obtain the best for both parties.

In practice, the team found that, in most cases, electrical control equipment was housed in steel cabinets mounted on the outside of the machine, although there were instances where it had been built into a machine column. Of the equipment itself, little is given, but on certain boring machines, ordinary pole changing a.c. motors were used to provide diminishing approach rates for automatic positioning to extremely fine limits.

Electro-Hydraulics

Special and transfer machines incorporate to a great extent electric signalling methods to control hydraulic or electric motor units. Great attention is given to accessibility on this type of machine, the limit switches used as the method of signalling being mounted externally wherever possible. As, however, these machines were found on production lines the reason for such construction becomes immediately obvious. Here and there electronic equipment was noticed, but rarely for control gear. In one example the d.c. supply for a variable speed motor was provided by such equipment, speed control effected by feed back from the motor back e.m.f. In most cases the use of electronic equipment was confined to amplifiers for measuring instruments.

Copies of the report, price 3s. 6d. post free, can be obtained from the British Productivity Council, 21 Tothill St., S.W.1, or from the Machine Tool Trades Association Inc., Southampton Row, W.C.1.

Orders and Output—1952

THE BRITISH THOMSON-HOUSTON CO. LTD

IN the limited space available it would virtually be impossible to present a detailed account of the work completed and the orders received by the British Thomson-Houston Co. during 1952. The following account therefore can only be regarded as a selection of the "highlights" and the more important items dealt with by the firm during the year.

Steam Plant

Dealing first with steam plant, two further 60 MW turbo-alternators were ordered by the B.E.A. for Marchwood generating station and two additional 30 MW sets for Goldington, Bedford. A departure from the company's normal practice in the latter sets is the introduction of separately mounted stop-valves and the change of location of the valve-chest from the top to the lower side of the h.p. cylinder. An interesting machine shipped abroad was the second 25 MW set for the Ford Motor Co. of Windsor, Ontario. This unit passes off 240 klb/hr of steam at 175 lb/sq in. for process work, and 310 klb/hr at 12 lb/sq in. for heating. Overload conditions are unusually high, being 31·25 MW.

Development work is being carried out for magnetically controlled excitation for the sets at Marchwood. This system compares the voltage to be controlled with a reference, and the error is amplified by a magnetic amplifier. The output of this provides the main exciter field, and the main advantage claimed for the system is the rapidity of operation and the elimination of valves and contact-making voltage relays. Design work in the turbine field includes large machines ranging from 60 to 120 MW to operate on reheat, a 30 MW single-cylinder 3,600 r.p.m. set; and new standard lines in industrial condensing back-pressure and extraction units. Other development work includes a new lubrication system using a direct-driven centrifugal pump and improved gland sealing, and a new gear-type coupling is shortly to be introduced in lieu of the well-known claw coupling generally used in large machines.

Hydro Plant

Largest machines, in physical size, completed during the year were the first three vertical alternators for Owen Falls, Uganda. Six of these machines are on order, and although they are rated at only 16,700 kVA, they are 28 ft over the casing. This is due to the low speed of 150 r.p.m. A special excitation system has been devised for these machines to obtain a high rate of response, despite the low speed. An electronic voltage regulator is used to control an Amplidyne pilot exciter feeding the field of a buck-boost exciter which is in series with the main constant-voltage exciter supplying the alternator field. The buck-boost and Amplidyne exciters are driven by a d.c. motor connected to the main exciter, which is in turn direct-coupled to the alternator shaft and has slip-rings to provide a.c. power both for the governor motor and the electronic amplifiers.

Another interesting set shipped was an 18,000 kVA 250 r.p.m. vertical alternator for Bardufoss power station, Norway. This lies well north of the Arctic Circle and will be the most northerly power station of any appreciable size in the world.

Industrial Machines

Several large motor-converters and motor-generator sets for electrolytic duty were completed, and in one m.-g. installation an Amplidyne constant-current control scheme was incorporated. Many synchronous motors for mine ventilating fans in South Africa have been supplied, and two more 30 MW synchronous condensers for New Zealand were completed.

The demand for and production of pumpless steel tank rectifiers have remained at a high level. Most of the rectifiers under construction have been of the MB6/16 type, which is probably more compact than any other air-cooled type. One of the more important installations completed was that at Uniao Fabril do Azoto, Portugal, which is the first high-power electrolysis plant to use pumpless steel-tank units.

In the electronic control field, developments have been considerable. The demand for photo-electric equipment has increased and many commercial equipments produced. In one of these the apparatus detects a pinhole 0·010 in. in dia, in a steel strip 48 in. wide travelling at a speed of 1,000 ft/minute.

The "Emotrol" system of motor control has undergone further development and many installations have been effected. One order for 11-100 h.p. equipments calls for provision to be made for the equipments to be used individually

to control a 100 h.p. motor or, in parallel, to control a 200 h.p. motor from a single control station.

In the field of industrial heating, a self-contained, 15 kW forced-draught fan air-heater was developed and applied successfully to a continuous grain dryer, and is suitable for use on "in-sack" platforms. The unit construction comprises a centrifugal fan with a 15 kW "Pyrobar" forced-draught air-heater mounted on the casing. The heater and fan circuits are interlocked so that heat cannot be applied until the fan is running.

In the direct-heating field, among equipments completed during the year were ten sets of 200 kW 415 V Pyrobar cast-in heaters for heating the tinpots of the hot-dip tinplate machines at the Trostre Works of the Steel Company of Wales.

Switchgear and Transformers

Outdoor oil circuit-breakers have continued in great demand; and orders booked for the Type JB breaker range, having all three phases in one tank, constitute a record. Thirty are for E.S.C.O.M., South Africa, 14 for the South Wales Electricity Board, and 15 for India. Fifty have been despatched for Victorian Railways, Australia. An important advance during the year has been the extension of this switchgear range to cover 110/132 kV service at ratings up to 1,500 MVA.

"Shuntarc" 132 kV oil circuit-breakers in hand include fifty-five for a rating of 3,500 MVA for the B.E.A., while an extension contract for eight further 132 kV 3,500 MVA breakers for Taaibos has been received from E.S.C.O.M.

Work has continued on the production of 275 kV and 220 kV "Lenticular" breakers on order and manufacture of the 220 kV 5,000 MVA breakers for the State Electricity Commission, Victoria, is well in hand.

Large installations commissioned in this country include a 22-unit, 33 kV 1,000 MVA double-bus outdoor installation at Rye House; a 12-unit, 132 kV 2,500 MVA double-bus switching station at Skelton Grange, and at Red House and West Melton a total of seven 132 kV, 2,500 MVA equipments. Commissioning of the first three 132 kV, 2,500 MVA air-blast circuit-breakers at Brunswick Wharf has also been successfully accomplished.

Transformers completed during the year include the fourth generator transformer of 75 MVA, 14/132 kV for Staythorpe, the second pair of 60 MVA, 132/66/11 kV units for the London Division, Holloway Road Substation; two 60 MVA 132/33 kV units for Hatfield and one 60 MVA 132/66 kV for Cheltenham. The first 120 MVA transformer for the 275 kV system is nearing completion in the factory and new orders include two more 120 MVA 275/132 kV auto-transformers. Four more 72 MVA generator transformers have also been ordered, two for Meaford "B" and two for Yarmouth.

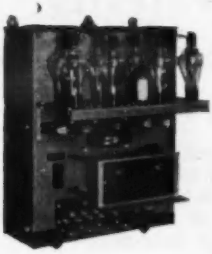
Heavy Industrial Plant

It has been a busy year in the mining equipment field. Two winder equipments, using the "closed loop" Ward Leonard system have been ordered for Hem Heath Colliery near Stoke, each comprising a 2,500 h.p., 244 r.p.m. main d.c. motor with a 1,675 h.p. motor generator set. This system uses the Amplidyne to give close control of speed, torque and acceleration. In the majority of cases employing a.c. winders the "Magnestat" has been employed to give automatic adjustment of excitation to the most suitable value for the load. Equipments of this nature up to 3,500 h.p. are in hand and orders have been completed for South Africa, Britain, Spain, India and Malaya.

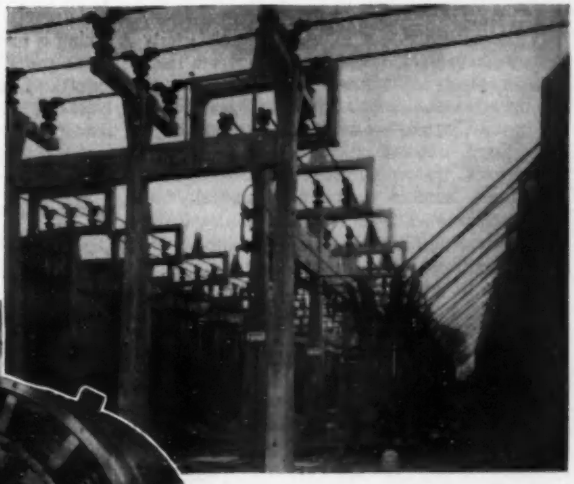
Conveying of coal from the face to the shaft has produced an increasing demand for large drive equipments, and a considerable number of these are in hand, ranging from 125 h.p. up to 420 h.p. An increase in orders for gate-end gear and underground transformers has also been experienced.

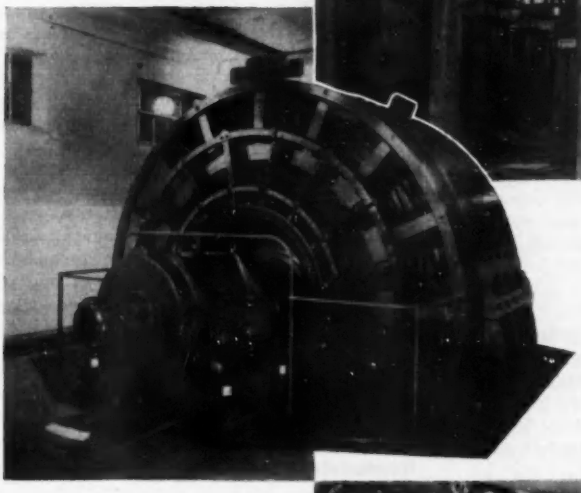
Orders have been received from Ransomes and Rapier for Appleby Frodingham Ltd. covering the complete electrical equipment for two large walking draglines. One of these will be a Type W1400, essentially a duplicate of the one recently supplied to Stewarts and Lloyds for the Corby Works. The other, a Type W600, will be about half the size of the Type W1400. The company has continued to supply electrical equipment for other sizes of excavator, including Ward Leonard types with control exercised on the generator fields, and fitted with master controllers and contactors.

Mazda lamps and lighting schemes have continued, both in the street lighting and industrial fields, to draw attention, and many installations have been completed or are in process of completion. Fluorescent lamp installations have been completed at Thames Haven and Shell Haven, where flameproof fittings are being used. Among street-lighting installations, those at Cambridge and in Lanarkshire are worthy of notice, and the one-time experimental fluorescent installation in Old Bond Street has now been replaced by a permanent system along the whole length of this street.

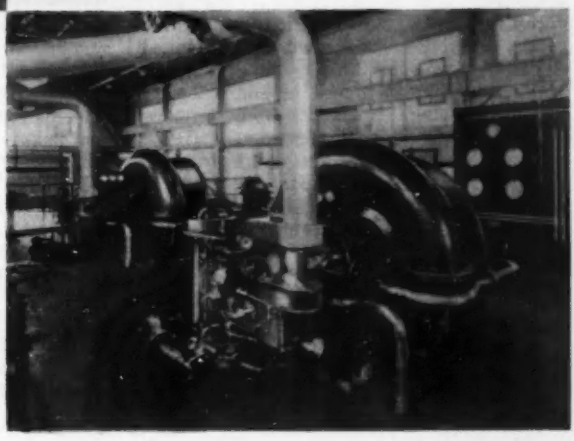


On the left is a special quadruple grid-controlled rectifier unit for controlling "sidelay" in a cloth tentering machine. Immediately below is a general view of a 22-unit 33 kV, 1,000 MVA rating double-bus switchgear installation at Rye House generating station of the B.E.A.





On the left is a B.T.H. 4,000 h.p. (12,000 h.p. cut-out) 50/120 r.p.m. d.c. reversing motor driving a 37-in. cogging mill at Round Oak Steelworks, Brierley Hill



Two B.T.H. turbine-driven gas exhausters, each capable of dealing with 567,000 cu ft of coke-oven gas per hour. These are in regular service at the Vanderbije Park works of the South African Iron and Steel Corporation

ARCING in unearthed systems

E.R.A. REPORT DISCUSSES MAGNITUDE OF OVER-VOLTAGES

IN the early days of high-voltage electricity transmission, it was usual to operate lines with neutrals unearthed. This conferred certain advantages, notably that of being able to continue operation with a fault to earth on one phase. However, as the length and voltage of transmission systems increased, difficulties became apparent, especially as regards over-voltages during faults, and earthed-neutral operation came into the favour which it still attracts.

This history is discussed briefly in the introduction to a newly-published E.R.A. report, in which Mr. S. SILBERMANN, Dipl.Ing., M.I.E.E., presents a critical résumé of information on "Arcing Phenomena in Unearthed High-Voltage Systems." He suggests that while recent investigations show that isolated systems are liable to higher over-voltages than earthed systems, these are not of the magnitude expected. Moreover, the operating records of unearthed systems in recent years do not bring absolute evidence of much greater failure rates than in earthed systems.

Improved Insulation

A possible explanation of this last contradiction of earlier evidence is that at the time when most of the systems changed over to earthed operation, improvements took place in the design of insulation, and the resulting benefits were credited largely to earthed-neutral operation.

In this country, most electricity systems are solidly or resistance earthed. The United States also favours these methods, together with reactance earthing, but there are still some systems operating unearthed. Germany adopted earth fault suppressors, and the countries of middle and northern Europe are following this lead. In France, resistance earthing is adopted in cable networks, and reactance earthing in overhead systems, whilst the Soviet Union prefers unearthed and reactance-earthed operation.

With this background, the available theories and test and operating results are examined at length in the report. It is concluded that transient phenomena in unearthed lines can be approached mathematically only by introducing great simplification, while in cases where arcing is involved, a mathematical approach is made more uncertain because there is insufficient knowledge of the mechanism of the arc. Network analysers can be of some value in investigating such fault conditions.

Line-to-Earth Faults

The most severe over-voltages are found to occur with a single line-to-earth fault, or with other troubles in association with such a fault. Unlimited steady-state over-voltages and over-currents which are theoretically possible under conditions of resonance are, however, in practice limited by the influence of such factors as damping resistors, corona, flashover, etc.

Tests carried out on artificial unearthed systems have produced transient over-voltages (not affected by any kind of damping) up to 5·2 times line-to-line neutral voltage for arcing earths, and up to 8·3 times normal line-to-neutral voltage for switching surges. When such tests were applied to actual lines, very different magnitudes were obtained. For instance, the steady-state power frequency maximum over-voltage was 3·9 times normal line-to-neutral, but only 1·5% of all cases exceeded three times, and less than 63·5% exceeded twice line-to-neutral voltage. For transients, up to 5·4 times normal line-neutral was recorded, but less than 1·3% exceeded five times, less than 7·7% four times, and less than 26·7% three times.

Remote Over-Voltages

It is found that in extensive unearthed systems, higher over-voltages occur at places distant from the fault, because of the capacitative nature of the current. At the location of an arcing earth, transient over-voltages on the sound phases are higher than on the faulted phase.

So far as circuit parameters are concerned, smaller ratios of zero-sequence capacitative reactance to positive sequence capacitative reactance produce higher over-voltages, as do smaller ratios of zero-sequence capacitative reactance to resultant positive sequence reactance. Resistance in the fault decreases over-voltages. Load transformers are also found to have some effect: in general, a low saturation of the transformer increases over-voltages.

PROBLEMS AND PRACTICE in Engineering

Uses of KWH Meters

I HAD occasion recently to repair a hotplate on a domestic stove. The hotplate in question was of the enclosed element type, and it was not possible to see visually whether or not it was working correctly on all three positions of the controlling switch, viz.:—low, medium and high. But it was known to be continuous between all three pins connecting it to the stove.

The fault was reported to be that the plate did not get any hotter on the med. and high positions of the switch than it did on the low position; and not having any detailed measuring apparatus available at the time, the problem was to check this point without having to wait for the plate to heat up, and reach a steady temperature on all three positions, one after the other.

The method used was to assess the current consumption on each switch position, using the household meter. All other electrical apparatus in the house was switched off, and as a guide, the speed of rotation of the meter disc was observed with the other serviceable hotplate on the stove switched to its three positions, low, medium and high in turn. The difference in speed on the different switch positions was easily discernable, especially if another person was made to operate the switch, while one watched the meter.

Then this was tried with the faulty hotplate and switch, and no difference in speed was noticed on any of the three switch positions, so a faulty switch was suspected.

The switch was dismantled, revealing dirty and non-making contacts, which were cleaned and adjusted. The switch was then replaced, and the operation of the cooker checked once more against the meter.

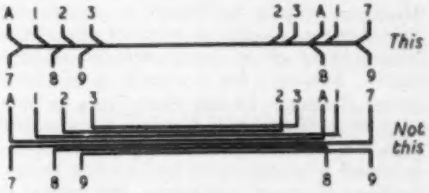
This time the change in speed was noticed. Slow on the low position, faster on the medium position, and fastest on the high position, which appeared to be correct.

This, indeed, proved to be the case when the hotplate was used later, and the method seems to be capable of giving a reliable indication of whether the hotplate and switch are working correctly, without waiting for it to heat up or using any measuring apparatus, even if the element is enclosed and cannot be observed without difficulty.—*B. J. Alcock.*

Colour in Control

MOST of Mr. Wilkins' points regarding the use of colour (January 15) and other aids to the easy tracing of control panel circuits are so obvious that our manufacturers should need no prompting in their adoption, especially when the choice of colour in cable covering is today so varied. The "stay-put" wiring diagram advocated by him should show the schematic layout of the various coloured circuits, again simplifying the job of the maintenance man to trace easily the particular circuit he may suspect, and the contactors, relays, etc., should be marked with the letter or number shown on the key diagram. In the training of apprentices they should be encouraged to study the development of schematic diagrams of simple direct-on starters and other types of control circuits and so familiarise them in breaking down complicated diagrams.

Why must most wiring diagrams be made to look so terrifying, with every single cable run shown, making the tracing of one cable in the midst of several more so difficult and easily misread? Some diagrams do simplify this by the bunching of cable runs making the whole so much more tidy and foolproof. If a numbered cable enters the bunch one has only to follow a single line and look for its emergence close to the particular item it serves.



A suggested circuit diagram for bunched runs

Faults in control gear are mostly confined to bad contacts, spring failures, broken flexibles, insulation tracking, etc., and only rarely to panel wiring faults, and if once the use of the key or schematic diagram is inculcated the rapid localisation of faults is almost assured without the heartbreak of laboriously tracing and checking the wiring of probably healthy circuits before reaching the culprit, whose fault is usually found to be of a simple kind and easily remedied.—*T. H. Snelson.*

Steelworks Electrics

SPECIAL FEATURES DESCRIBED AT A.S.E.E. MEETING

ALTHOUGH both the Abbey and Trostre works of the Steel Company of Wales have been described in these pages, the equipment there is so vast that much information about the electrical equipment remains to be recorded. This was made apparent last week at a London meeting of the Association of Supervising Electrical Engineers. The lecturer on this occasion was SIR HENRY CLAY, BT., M.A., M.I.E.E., and he based his remarks largely on experience at these two great installations.

Since the layout and equipment of these works has been dealt with, only some of Sir Henry's incidental comments will be reported here. For instance, it is an interesting illustration of the scale of electricity use that the average of 180 kWh/ton used in the 60 MW plant (excluding cold-finishing equipment) is just equivalent to the heat energy needed to bring the steel up to its melting point.

An outstanding example of the effects of size is found in the bridges which unload foreign ore from ships. The power required for these is such that supplies have to be given at 3·3 kV even though a "trailing cable" feed is necessary. A large drum moving with the bridge takes up and lays down the cable.

Control Gear

In equipping the blast furnaces at Abbey, which are largely automatic in action, the experiment was made of using telephone-type relays instead of the more conventional contactors. This move has resulted in considerable saving of space. Cranes which work in conjunction with the blast furnaces are supplied with d.c. and have their control contactors mounted in special rooms in the crane bridge. Because of space restrictions the contactor panels are arranged to hinge forward to allow of attention being given to the back of the gear. Mill-type motors are used in the cranes and as aids to maintenance, these machines have tapered shaft extensions to permit easy changing of couplings, and hinged frames for quick removal of an armature. Because of the heat radiated by the molten steel carried, the crane cabs are fitted with cooling equipment.

At one stage in the operations a 130-ton car has to carry ingots. Three mechanical limit switches—two slow and one stop—were installed to prevent the car from reaching the backstops. However, on one occasion the car, which is sprung, vibrated at such a frequency that it missed all three stops while moving at full speed. Three sets of duplicate photo-electric relays are now used instead of mechanical limit switches.

Rectifier Supplies

D.C. motors for roughing mills at Abbey total some 29,000 h.p., and they are supplied through pumpless steel-tank mercury arc rectifiers of 21 MW continuous capacity. The Abbey mill was the first to be designed for rectifier feed, but it is unlikely that any future mills will use motor generator sets, because rectifiers are more efficient and the light running losses are very much less. At Abbey, to reduce the risk of disturbances from harmonics, the 30 six-phase rectifiers are arranged in groups of six to give effectively 30-phase rectification.

The Trostre tinplate works likewise contains many interesting features, one of the most noteworthy being the 11,580 h.p. synchronous motors. These are wound for 11 kV and supplied through their own transformers from a 33 kV system. Although they are normally started through a reactor, they can be started direct-on-line, in which condition they take 30 MVA. They are believed to be the largest motors to be started by this method. No bad effects were noticed on the system from this operation.

Lighting

Lighting steelworks presents special problems. The bays are wide and high, and it is seldom possible to use the cranes for attending to the lighting fittings. Moreover, individual light sources can be quite large, a typical one comprising two 400 W mercury vapour lamps and one 1,500 W tungsten lamp. Reflectors are anodised aluminium sheets which are considered as expendable. Besides improving colour rendering, the inclusion of a tungsten lamp reduces the risk of blackout following a serious dip in supply voltage.

For the large marshalling yards associated with steelworks, the cheapest method of lighting has sometimes proved to be the erection of high towers (150 ft) each supporting up to 24 one-kilowatt flood-lighting fittings.

PRODUCTION in Electrical Engineering

CENSUS REPORT SHOWS SHARP INCREASE

GROSS output of the electrical engineering industry in 1948 was valued at nearly £230m, compared with £56m in 1935. This is one of the leading statistics in a newly published Board of Trade report which covers "establishments engaged wholly or mainly in the manufacture of electricity generating plant, transformers, dynamos, electric motors, switchgear, electrical equipment for motor vehicles, cycles and aircraft, and other electrical goods." (Final Report on the Census of Production for 1948, Vol. 4, Trade K, Electrical Engineering (General). H.M.S.O., price 5s.)

Results for larger firms (those employing more than ten persons, on average) are given in Table 1. In addition, it is estimated that there were 972 small firms. The estimated average employment in all firms is 265,385.

Large Concerns

Thirty-one establishments employing over 1,500 people account for nearly half the total employment in the industry and also a similar proportion of the gross output. Net output per person employed ranged from £565 in firms with 400-499 employees (there were 29 of these), to £446 for firms with 11-24 employees (219 in total). The largest firms had an average of £496, the same as the average for all "larger establishments." Territorially, 26·2% of the net output came from establishments in London and South-east England, 27·3% from those in the Midlands, and 18·5% from North-western England. In no other region of Great Britain was the output more than 6·6%.

So far as specialisation is concerned, 482 of the larger establishments are noted, of which 248 are producers of electrical machinery, 43 of electric equipment for motor vehicles, cycles and aircraft, 70 for electric cooking and heating apparatus, and 21 are establishments specialising in contract work.

Detailed returns are shown in the report for a very wide range of products: from a.c. generators "over 30 MVA" to "flashlight cases, complete." Summarised figures for some main classes of machinery are shown in Table 2, and the high aggregate of f.h.p. motors is especially worthy of attention.

TABLE 2. PRODUCTION OF MACHINERY

DESCRIPTION	1948	1937
A.C. Generators	2,400 MVA	1,400 MW
D.C. Generators	290 MW	359 MW
Traction Motors	325 th. h.p.	357 th. h.p.
F.H.P. Motors	360 th. h.p.	85 th. h.p.
Transformers	9,850 MVA	6,780 MVA

(These figures have been rounded off)

In all, the larger establishments in the industry paid some £45·46m in wages and salaries to 197,124 "operatives" and 61,359 "administrative, technical and clerical employees." The industry spent £5·65m on new and second-hand plant and machinery, and £0·44m on vehicles. Capital expenditure on building work amounted to £2·09m.

Finally a division may be noted between the countries of Great Britain. For the "larger establishments," 812, with a gross output of £220m are situated in England; 31 in Wales (£3m), and 49 in Scotland (£7m).

TABLE 1. PRODUCTION IN THE ELECTRICAL ENGINEERING INDUSTRY—LARGER ESTABLISHMENTS ONLY

Amounts in thousands of pounds except where numbers are indicated

	1948	1946	1937	1935
Gross output (production)	229,791	155,514	75,520	55,846
Cost of materials and fuel used	99,173	60,838	33,229	23,216
Payment for work done or materials given out	2,385	1,664	218	143
Net output	128,233	93,012	42,073	32,487
Wages and salaries of persons employed	79,495	63,731	—	—
Average number of persons employed	258,561	244,910	177,321	148,957
Net output per person employed	0·496	0·380	0·237	0·218
Stocks at end of year:				
Finished products and work in progress	60,094	42,142	14,428	7,521
Materials and fuel	33,117	18,548	—	—
Number of establishments	892	—	—	522

MAGNETIC MEASUREMENTS

Accurate Valuation of "B" and "H"

METHODS for the measurement of magnetic force, "H," with a considerable degree of accuracy were described at a Measurements Section Discussion at the I.E.E. last week. The opener, Dr. A. J. King, pointed out that, although the measurement of magnetic flux in a bar specimen had presented no great difficulty, large errors were formerly obtained between measured and calculated values of "H." The main cause of these discrepancies was the non-uniformity of field in the test region.

Permeameter Development

However, providing extra m.m.f. by compensating coils near the joints between specimen and yoke constituted a major step forward in the development of the bar and yoke permeameter. By providing the necessary magnetic force for the remainder of the magnetic circuit, these coils left the magnetising coil to provide for only the specimen inside it. The resulting field in the test piece was then as uniform as if it were produced by the infinitely long coil and specimen, thus enabling an accurate calculation of the magnetic field strength to be readily made. In fact, agreement was then so close between measured and calculated values of field that it became the most useful of the various co-existing criteria of field uniformity. Its added value derived from the ability to permit testing at pre-determined values of "H," thus simplifying test recording.

Although the above method was admirable for standard specimens, small or non-standard sizes called for a degree of improvisation. From isotopic material, castings and the like, a small ring could sometimes be cut, which would permit readings up to 100 oersteds. In other cases a "VARIMAG" permeameter might be used for testing specimen bars down to 1 in. long, at field densities as high as 1,500 oersteds. Here, however, absence of compensating coils necessitated restricting the measurements of "B" and "H" to the centre of the specimen, where some degree of field uniformity could be expected. In a third method, which had often proved successful, using a ring specimen, measurement of flux was performed with a concentrated winding of a few turns, "H" being measured using a 'SILMANAL' or moving-coil element occupying only a few millimeters. With this method it was not necessary to cut the ring specimen to measure segments of it, and at the same time obtain tolerably close agreement with the normal ring test.

Value of Magnetic Tests

There were several reasons why magnetic measurements of a specimen were required. If the measurement was an acceptance test of the material under good magnetic conditions, it became apparent that the specimen should be representative. Moreover, care should be taken to ensure that heat or mechanical strains which might result from preparation of the specimen should not affect its permeability. Hence, the preference, when testing strip specimens for as wide a strip as possible. On the other hand, it should be borne in mind, when questions of accuracy were under discussion, that a sheet of electrical steel could vary in permeability by as much as three to one in different parts of the same sheet. There was in consequence, much to be said for a whole sheet or bar tester, which could operate on a completed sheet or bar without cutting.

In arranging for test samples of solid materials it was well that knowledge should exist of the metallurgy of the work concerned.

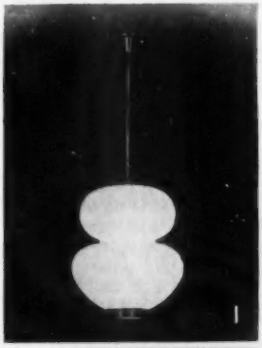
General Discussion

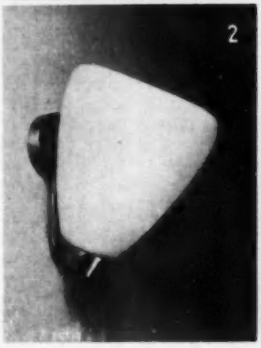
In the general discussion, one speaker said he had found that samples of nickel iron required much more careful preparation than those of silicon iron. The difficulty of measuring "B" in a bar specimen was referred to, and it was agreed that a long solenoid should be used only when the length of a bar specimen was great in proportion to its width.

The cutting of material, even at a width of 4 in., was felt by one speaker to affect the accuracy of measurement unless the strips were subsequently annealed, and another speaker referred to experiments on cold worked specimens. Mechanical damage and uncontrolled periods of cooling were, it was thought, often responsible for large variations. A suggestion was made that lamination assembly would possibly introduce self-cancelling variation between individual sheets, and the question of statistical techniques was also introduced. One speaker reported that the effect of finite length of specimen could be reduced by using a long solenoid allied with feedback measurement systems.

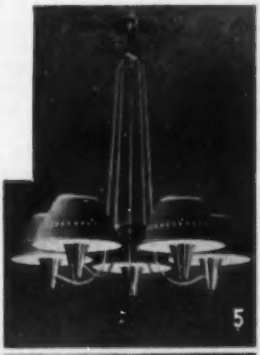
Contemporary Style for 1953 FALKS FITTINGS

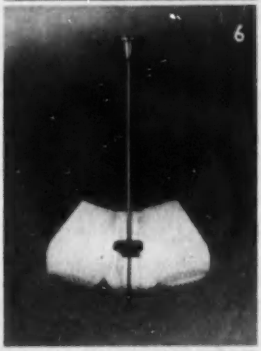
IT is pleasing to note that yet another company is introducing a range of contemporary lighting fittings to add a refreshing touch to internal illumination in the coming year. Reproduced on this page are illustrations of seven of the complete range produced by Falk, Stadelmann and Co. Ltd., well-known lighting specialists. They are designed for use in schools, large departmental stores, hotels and similar commercial premises, providing, in novel and striking design the finishing touch to modern architectural features. Much use has been made of the "mushroom" motif in reflectors, shown most impressively in the "Canopus" model, which provides both ceiling and downward illumination. Most elegant perhaps is the "Pegasus," a model of distinction which has been selected by the British Council as an example of industrial design in this country for display at the Rhodes Centenary Exhibition at Bulawayo in July of this year. In similar vein, the "ARGUS" model is fitted with attractive maroon flock shades and would grace equally well a home or an hotel. Inglass bowls, the satin finish has been adopted in many cases, and compares more than favourably with its sand-blasted counterpart. All fittings shown on this page were designed by J. M. Barnicott, M.S.I.A., Falks' chief designer, who has provided many fittings with identical bowls or reflectors to aid both production and maintenance, on show at the showrooms in Mount Street, W.1





1. *"GEMINI," a distinctive fitting in satin finished glass, takes one 200 W lamp.* 2. *This fitting, "DELPHIN," is for upward or downward lighting;* 3. *The "CANOPUS," 28 in. in diameter requires one 300 or 500 W lamp*





4. *The "ORION," available in two sizes for 100/150 W or 200 W lamps.* 5. *For five 100 W lamps, this is the "ARGUS" model.* 6. *"CARINA." The shades are stated to be stronger than pleated paper, and allow for ceiling and floor lighting.* 7. *Elegant lines in the "PEGASUS," a fitting for three 100 W lamps. Its "saucer" type reflectors are in "Perspex"*

overseas news

H.E. Scheme

At the end of next month the 20,000 h.p. hydro-electric plant at Scott Falls, on the Michipicoten River, Ontario, is to be officially put into operation. Originally, the project was due to be completed last October, but delay in delivering machinery has postponed the event. This new station is constructed only a few hundred yards downstream from the High Falls 31,000 h.p. plant which was built in 1929. To meet the increasing demand for power two more stations are already visualised which will provide a further 35,000 h.p. we learn.

St. Lawrence Project

The possibility of a start being made on the St. Lawrence Seaway and Power project this spring is now remote it is admitted in Toronto. It is maintained there, that the application by the Public Power and Water Corporation of Trenton, New Jersey (suggesting itself as the U.S. entity to co-operate with Canada) was an intervention calculated to cause delay, and instead of summarily dismissing the motion, the U.S. Federal Power Commission adjourned its hearings till February 2. In Canada it was believed that Mr. Truman had intended to designate the New York State Power Authority under the agreement with Canada, but the Trenton intervention spiked that plan. In the long view, Canadian authorities are still optimistic, pointing to the presence of several known Seaway supporters in President Eisenhower's cabinet. But some anxiety is caused by the activities of U.S. interests trying to revive the idea of U.S. participation in the project, which, it is feared, might involve further delay.

Brazil Expansion

A further project covering the expansion of Brazil's power production has been approved by the joint Brazil-U.S. Commission for Economic Development. This project refers to the reorganisation of the Cia. Matogrossense de Electricidade and provides for (a) the construction of a 9,000 kW hydro-electric plant at Mimose on the River Pardo, (b) a further 1,000 kW diesel generator at Campo Grande, (c) the construction of a 69 kV single circuit transmission line from Campo Grande to Aquidauna, (d) the establishment of terminal transformer stations, and (e) the installation of a 1,500 kW steam turbine alternator at Corumba. In addition there is to be an expansion of the distribution network in Campo Grande, Aquidauna and Corumba. The new hydro-electric station, referred to above, is to be completed by 1956, it is stated.

Standard Tariffs in Spain

A standardised system of electricity tariffs applying throughout the country, was put into effect in Spain this month, under a decree which was recently promulgated. The principal aim of this change, apparently, is to finance the expansion of power generating resources in order to keep pace with increased consumption which is amounting to about 15% annually. The Minister of Industry, Senor Plannell, said the new system envisages the payment of subsidies for new development and the adjustment of tariff rates charged by the older plants. Unless power output increased considerably, there would have to be severe restrictions during the next five years, he has pointed out. Domestic consumers, however, have been assured that the new system will mean only a negligible increase in charges. For the decree also abolishes the surcharge imposed on all electricity accounts, the proceeds of which were devoted to the alleviation of unemployment in industries affected by the power cuts in 1949 and 1950.

Escom Extensions

The Electricity Supply Commission of South Africa is working on the scheme to extend its Natal 33 kV transmission system to link up with that of the Witwatersrand. One power line is being extended to Greytown and another from Warden to Reitz and Vrede in the Orange Free State at the present time, we understand.

Egypt's Order

An order valued at E£339,831 has been placed by the Egyptian Government with the French engineering firm, Alsthom, providing for the supply of electrical equipment for one of four sections of the Cairo-Helwan railway line which is to be electrified. The equipment is to be delivered within 3½ years, we understand. Equipment for the three other sections will be supplied by German and Finnish firms, it is stated. Total cost of the project is put at E£3 million.

Six-Year Plan

The Japan Electric Power Development Co. which was established last September, is to push ahead this year with the major six-year power resources development plan despite warnings from the World Bank that earlier loan estimates were excessive. The present plan provides for the construction of power plants with a total generating capacity of 6,278 MW during the six years at a cost of 900,000 million yen. Work has already started on eight sites which have been

selected, and construction is to start on another very shortly. The nine power companies set up are planning to construct 44 hydro-electric and ten thermal power plants with a total capacity of about 300 MW during this fiscal year. Several industrial enterprises will also build their own power stations to meet high power costs.

Connaught Bridge Starts up

The new Connaught Bridge steam power station of the Central Electricity Board, Federation of Malaya, went on commercial load a few days ago. The first half of the station is to contain two 20 MW sets, but initially only one of the Parsons turbo-alternators is operating with two Babcock and Wilcox 120 k lb/hr boilers. It is expected that the second turbo-alternator will be put on load sometime in March.

Queensland Expansion

Four more western towns in Queensland are to be provided with an electricity supply from independent generating plants. The four towns are Tambo, Morven, Augathella and Bollon, and the State Electricity Commission is to call for tenders immediately for the plant and materials needed, Mr. Riordan, Minister for Mines, has stated. These four new power schemes are to be on similar lines to the ten commissioned last year to which we referred on January 8. He also stated that the Townsville power station, with a capacity of 22,500 kW was expected to be completed about March, while another 7,500 kW generator would be installed at the Howard power station this year.

Resuming Work at Sydney

The New South Wales Government has now agreed with the Railways Department that work on the electrification of the western railway line from Parramatta to Lithgow shall be resumed. British Insulated Callenders Construction Co. Ltd. are carrying out the £4 million contract for the Railways Department. It may be recalled that work was stopped last September when the Government decided to cut State works because of the shortage of loan funds. Mr. F. Kitchin, resident director for the contractors, has stated that the company was about to erect the first steel structure when work was suspended. Resumption of work is to begin following an agreement on the question of costs which had accrued to the company because of the stoppage. But the date of completion of the contract is to be 1957 instead of October, 1954, as originally stipulated, we understand. The State Premier has also announced that the Railways Department would abide by its contract with the Metropolitan-Vickers Electrical Co. for the supply of electric locomotives for the western line electrification.

Restrictions Go On

There seems to be little hope of an early improvement in the Australian imports situation, judging by remarks of Senator O'Sullivan, the Minister of Trade and Customs. At Melbourne last week he said that it would be at least a year before the import restrictions could be lifted. Until Australia's exports can pay for her imports, the restrictions must remain, he said. But there may be some easing of restrictions this year if the trade balance continues to improve. Pointing out that the restrictions had saved Australia about £A500 million, while her oversea balances had increased by £A150 million, he stressed that the Government would keep its promise to lift the restrictions as soon as possible, and these would be ended gradually.

Change in Queensland

The City Electric Light Co., Brisbane, was congratulated a few days ago by the Queensland Premier, Mr. Gair, on the part it had played in providing a power distribution system in South-east Queensland. Mr. Gair was speaking after the signing of an agreement under which the company is to be replaced as from February 1 next by a public authority, as we exclusively reported on December 25. The agreement, which was made between the State Government and the Southern Electric Authority of Queensland, follows the passing of the Southern Electric Authority Bill in the last Parliamentary session. The members of the new Authority which has been set up are Messrs. E. S. Cornwall, H. H. Corser, J. H. Hoare, J. H. Holmes, G. G. L'Estrange and Mr. H. Neil Smith (the State Electricity Commissioner).

Using the Gas Turbine

Judging from recent experiments there are strong hopes now that gas turbines burning brown coal may in the future be used as power units for the State Electricity Commission of Victoria and possibly the State Railways. Promising results have been reported following 18 months of investigation by the Commonwealth Department of Supply's Aeronautical Research Laboratories. In these many problems have been overcome, and the main one remaining is the elimination of ash deposit in the turbines. The director of the laboratories, Mr. L. P. Coombes, has said that early tests with an open cycle combustor had shown that there was little difficulty in burning pulverised Yallourn brown coal with high efficiency. Ash deposits had been a problem but an investigation into the fundamental causes had begun. Good results had been obtained from an all-metal combustor with film cooling of the flame tube, he stated.

Sale Price

A settlement had been reached between the State Electricity Commission of Western Australia and the North Fremantle Municipal Council regarding the price to be paid to the council for its electricity undertaking, the Minister for Electricity, Mr. Brand, has announced. Although he did not reveal the price, it is believed locally that the figure is about £55,000. This amount covers all the council's electricity assets, including transmission lines, transformers, and goodwill. The £55,000 is to remain vested in the Commission at the interest rate to be fixed for the new S.E.C. loan next year.

PERSONALITIES

IN THE INDUSTRY

Newly appointed chief mechanical engineer to the Telegraph Construction and Maintenance Co. is **Mr. A. D. Lidderdale,** A.M.I.Mech.E., M.I.Prod.E., who has been with the A.P.V. Co. Ltd. He will be responsible, under the directorship of Dr. E. W. Smith, for the management of the Engineering Division of the T.C. & M. Co., co-ordinating the activities of the specialist staff of cable engineers. Mr. Lidderdale spent the earlier part of his career with Leyland Motors Ltd., remaining with them until the outbreak of the war, during which he served with R.E.M.E., attaining the rank of Lieut.-Colonel and becoming assistant director of tank design.

Mr. A. D. Lidderdale

Tributes to the four years work of **Alderman H. Leason,** J.P., A.M.I.E.E., as chairman of the Midlands Electricity Consultative Council, were paid by the members of that Council at its meeting last week. His successor is **Mr. R. M. Barrow.** Alderman Leason has been 53½ years in the electrical industry and 23 years on the Stoke-on-Trent City Council, being Lord Mayor in 1946-47.

Lt.-Col. Geoffrey F. Falk, M.I.E.E., T.D., a director of Falk, Stadelmann and Co. Ltd., left London last Sunday by Comet on a business trip to East and South Africa. The company has four branches in the Union of South Africa, and is also opening a factory on the outskirts of Johannesburg where it is hoped to assemble many of their specialities. Col. Falk will be away for about nine weeks.

Three new appointments are announced by the Metropolitan-Vickers Electrical Co., Ltd. **Mr. H. W. Harden,** Assoc.M.C.T., M.I.E.E., is now assistant chief engineer, Transformer Department; **Mr. E. L. N. Towle,** B.Sc.(Eng), M.I.E.E., M.I.Mech.E., M.I.Mar.E., is promoted to assistant chief engineer (industrial), Electrical General Engineering Department, and **Mr. F. B. Holt,** A.M.I.E.E., is now consultant (industrial) in the latter department. Mr. Harden joined the company as a trade apprentice in 1919, serving partly in the h.v. section of the transformer drawing office. He transferred to the Transformer Engineering Department in 1925 and has had experience in all branches of transformer design and development, latterly specialising in large h.v. transformers. In 1944 he spent some time in U.S. studying American transformer practice and on his return took charge of the Projects and Tenders Section of the Department. In this capacity he has travelled widely abroad. Mr. Towle went to Trafford Park as a college apprentice in 1921. He then joined the Motor Department, becoming assistant textile engineer in 1924. After three years as assistant works manager of a firm of lift manufacturers, he returned to Metrovick in 1929, joining the industrial section of General Engineering Dept. In 1945 he was appointed engineer-in-charge, marine, and as such has been responsible for the co-ordination of diesel-electric propulsion schemes and marine auxiliaries. Mr. Holt, who now becomes a consultant, has completed over 50 years service with the company, having started with the British Westinghouse drawing office in 1902. From 1908 he specialised in switchgear and five years later became chief draughtsman of the switchgear apparatus section, being responsible for designing the H type of metalclad gear. From 1917 to 1920 he was chief draughtsman of the Control Department, but later joined the motor application section of the Motor Department. Later this became the industrial section of General Engineering Dept., in which Mr. Holt was chief textile engineer from 1924 to 1937 when he was placed in charge of the section. Since November 1950 he has been assistant chief engineer (industrial), Electrical General Engineering Dept.

Mr. H. W. Harden

Mr. E. L. N. Towle

Mr. F. B. Holt

Mr. James Hodge, M.A., A.M.I.Mech.E., A.F.R.Ae.S., Mem. A.S.M.E., a gas turbine expert and senior consultant of Power Jets (Research and Development) Ltd., is on his way to Columbia University, New York, for four months as visiting lecturer in gas turbines.

Just appointed assistant manager in Australia for the W. T. Henley's Telegraph Works Co., Ltd., is **Mr. C. G. E. Joslin,** A.M.I.E.E., who has latterly been a senior technical assistant in the Engineering/Sales Department of the company. He joined Henley's in 1929 and has spent nearly the whole of his career on the engineering side of the firm. He is due to take up his new appointment at the company's Australian head office in Melbourne next March.

Mr. C. G. E. Joslin

Mr. W. Allinson, of Crook, Co. Durham, has been appointed chief electrician at Fishburn Colliery, Co. Durham.

Ferranti Ltd., announce that **Mr. A. Hoadley** is now representing them in the radio and television interest in South Wales, Herefordshire and Gloucestershire. He replaces **Mr. C. Tillotson,** who is taking over other duties with the company. Mr. A. Hoadley has been associated with the radio industry since 1934, and is already well-known in the West Country and South Wales. His address is "Berkley," Oak Orchard, Hereford Road, Monmouth.

Mr. E. B. M. Grubb, the general manager of D. H. Bonnella and Son Ltd., has been appointed to the board of directors.

Mr. K. M. Chance has resigned from the Board of Associated Insulation Products Ltd. He is also chairman of British Industrial Plastics Ltd., and a director of Streetly Manufacturing.

Thorn Electrical Industries Ltd. have made three new staff appointments. **Mr. F. Roberts,** who was previously area sales manager in Cardiff and assistant area sales manager in Manchester, becomes north-western area sales manager of the Atlas Lighting Division, operating from Manchester. **Mr. J. Duffield,** who has been an Atlas lighting representative in the south-west of England for many years, is now south-western area sales manager of the Atlas Lighting Division, operating from Cardiff. Finally, **Mr. J. Martin,** ASSOC. I.E.E., who has been with the company for seven years, is appointed as north-western area technical sales manager of the Atlas Lighting Division, operating from Manchester. Mr. Martin, who is a registered lighting engineer, is a past chairman of the Leicester I.E.S. centre and the immediate past chairman of the Manchester I.E.S. centre.

The Elizabeth Sloan Chesser cup, awarded by the E.A.W. to the demonstrator sitting for the diploma in electrical housecraft who gains the highest marks during the year, has been won by **Miss Mary Cobbold,** of Cambridge. The runner-up was **Miss Catherine Dees,** of Sutherland.

Mr. R. L. Packer has taken up his duties as London branch manager of British Insulated Callender's Cables Ltd., in succession to **Mr. F. Samuel** who is retiring on March 8. After serving an apprenticeship with the Liverpool Cotton Association, Mr. Packer joined the former British Insulated Cables Ltd. in 1929 and, two years later, became a sales representative in the London branch, covering North London, Bedfordshire and Hertfordshire. In 1936 he was appointed branch manager at Southampton, a position he held until joining the Army in 1942. On demobilisation he rejoined the company as a transmission engineer in London.

Mr. R. L. Packer

After 51 years' service in the electricity supply industry, **Mr. A. J. Channing,** sub-area manager of the Central Sub-Area of the South Wales Electricity Board, is to retire in June next. He started with the Cardiff undertaking in 1902, and prior to vesting day was responsible for its commercial and administrative activities, under the engineer and manager (Mr. Edward Jones). Arising from Mr. Channing's impending retirement, the Board announces three appointments. The new sub-area manager of the Central Sub-Area is to be **Mr. E. W. Jones,** who at present occupies a similar post with the Board's Eastern Sub-Area. That position of sub-area manager, Eastern Sub-Area, goes to **Mr. C. L. Townsend,** ASSOC.I.E.E., who now holds a like post for the Board's Western Sub-Area. He, in turn, is being succeeded by **Mr. D. G. Gwyn,** B.SC., A.M.I.E.E., who is now responsible, in the Commercial Department of the Board at head office, for commercial aspects of industrial supplies. Prior to nationalisation he was electrical engineer and manager of the Barry undertaking since 1945, previous to which he was deputy engineer with the Neath R.D.C. undertaking. Mr. Jones, to be manager of the Central Sub-Area was, prior to 1948, engineer and manager to the Mountain Ash undertaking, which many will recall,

Mr. A. J. Channing

Mr. D. G. Gwyn

was a very go-ahead concern. Mr. Townsend, now to go to Tenby, was engineer and manager of the West Cambrian Power Co. from 1933 to 1948.

This month has brought the retirement from active business of an engineer who is extremely popular, particularly in the South Wales area, in which he has operated for nearly 50 years. We refer to **Mr. Sidney B. Haslam**, O.B.E., M.I.Mech.E., M.I.E.E., who started in business at Cardiff in 1905 with Mr. Theodore Stretton as Haslam & Stretton. That concern was dissolved in 1933, since when he has operated under his own name as a resident engineer and agent, representing many well-known electrical manufacturers in the area. He has also figured prominently in the activities of many technical societies. He was chairman in 1929-30 of the I.E.E. Western Centre, of which he was honorary secretary for many years; national president of the Association of Mining Electrical and Mechanical Engineers in 1940-41, and president of the South Wales Institute of Engineers in 1941 and 1942. He has read papers before the Institution of Mechanical Engineers, the South Wales Institute of Engineers, and the Association of Mining and Electrical and Mechanical Engineers, gaining a gold medal award from the last named for the best paper of the year in 1928-29. Trained at Faraday House, he was also president of the Old Students' Association in 1930. His many friends in the industry will join with us in wishing him a long and happy retirement.

Mr. S. B. Haslam

Mr. G. M. D. Shaw, B.Sc.(Eng.), M.I.E.E., district engineer for Thurrock district of the Eastern Electricity Board has been elected as a member of the Standing Committee of the Convocation of the University of London for a further three years. He was first elected to that committee in 1950.

Mr. G. M. Baker has been appointed a director of C. A. Parsons and Co. Ltd.

Laurence, Scott & Electromotors Ltd., announce that **Mr. P. Webb** has been appointed manager of their London office, to fill a position which has been vacant for some time. Mr. Webb, who served his apprenticeship with Metropolitan-Vickers, joined the Norwich staff of Laurence, Scott from A.S.E.A. about 20 years ago, and for some time has been chief estimator in the A.C. Department. He is succeeded in the latter position by **Mr. G. E. Sawyer**, formerly his chief assistant.

Mr. P. Webb

Mr. R. M. Garland has been appointed a director of Veeder-Root Ltd. He has been chief engineer for some years, and during the past two years has acted as deputy to the managing director. In Mr. Garland's new appointment he will be responsible for development production, and manufacture, while continuing to act as deputy to the managing director.

Mr. C. W. V. Davis, sales manager of the Magnetic Filtration Section of the Industrial Group of Philips Electrical Ltd., has recently celebrated his 25th anniversary with the company.

The two photographs at the bottom of this page were taken during the course of the E.U.S.E.C. conference on Engineering Education, to which we refer on page 194. That on the right shows, at the reception, **Col. B. H. Leeson**, president, I.E.E., **Sir David Pye**, president, Institution of Mechanical Engineers, **Sir John Hacking**, past president, I.E.E., and **Mr. H. F. Cronin**, president, Institution of Civil Engineers. The picture on the left, taken during a visit to the Rugby Works of the English Electric Co. Ltd., shows left to right Messrs. **Ir. A. Van Duursen** (Holland), **K. P. R. Lee** (Education Dept. I.E.E.), **E. Hianne** (Belgium), **J. W. Bispham** (education officer, Institution of Mechanical Engineers) and **G. S. Bosworth** (chief of technical personnel administration, English Electric Co.).

At the E.U.S.E.C. Conference. Left, a works visit, right, at the reception

The following promotions and moves in the Sales-Service Branch of Hoover, Ltd. are announced: **Mr. H. Wilcock,** previously branch manager, Scottish branch, Glasgow, is now field assistant to home sales manager, Perivale; **Mr. C. S. Bagstaff** has moved from district manager, Romford, to branch manager, Scottish branch; **Mr. I. F. Carter,** from Sales Personnel Department has become district manager, Bradford; **Mr. D. Harper,** previously staff instructor, Glasgow, becomes district manager, Darlington; **Mr. S. McIver,** supervisor at Glasgow North is now district manager, Norwich; **Mr. L. B. Smith,** previously branch office manager, Glasgow, is the new district manager at Liverpool; **Mr. S. F. Alsworth,** district manager, Norwich, has taken up similar duties at Chelmsford; **Mr. L. E. Y. Carroll,** formerly district manager, Darlington, goes to Walsall in a similar capacity; **Mr. C. B. Jones** goes from district manager, Walsall to district manager, Canterbury; **Mr. H Shore** from district manager, Liverpool to district manager, Wigan and **Mr. A. G. Wilkinson** from district manager, Canterbury to district manager, Romford.

Mr. J. Jones, M.I.Mech.E., M.I.Mar.E., M.S.A.E., managing director of the National Gas and Oil Engine Co., Ltd., and Associated British Oil Engines (Marine), Ltd., left Britain recently on a round-the-world tour. He will visit Holland, Italy, Egypt, India, Pakistan, Ceylon, Singapore, Manila, Hong Kong, Canada and the United States.

Mr. R. L. Bassett and **Mr. W. G. Patterson** have joined the board of Siemens Electric Lamps and Supplies, Ltd.

Vactric Ltd. announce that **Mr. J. Paterson** and **Mr. C. R. D. Brown** have resigned from the company's board. To fill the vacancies the Treasury has nominated **Sir Lionel Lowe** and **Mr. E. J. Barnsley** as directors of the company.

Mr. Douglas S. Macfarlane has been appointed a director of James Howden and Co., Ltd., and of James Howden and Co. (Land), Ltd. In addition to his present duties, he will be in charge of the marine side of the business.

OBITUARY

Another connection with the pioneers of the electric lamp making industry has been severed by the death, on January 17, of **Mr. Edward A. Gimingham,** M.I.E.E., aged 84, formerly managing director of the Edison Swan Electric Co., Ltd. He worked alongside his older brother, Charles Gimingham, who had been invited to join Sir Joseph Swan when the latter built the first important lamp factory in Newcastle. It was Edward Gimingham who made the first vacuum flasks for Sir James Dewar and the first oscillator valves for Sir Ambrose Fleming for whom he also conducted the experiments which led to the production of the first practical radio valves. The most important of Edward Gimingham's own inventions for the lamp industry was the "Pointalite" lamp. Another example of his work was the old Ediswan "Bi-life" which incorporated a reserve filament for emergency use. His work on the Fleming-Gimingham voltmeter, in collaboration with Sir Andrew Fleming, was instrumental in producing one of the first practical voltmeters for general use. Mr. Gimingham joined Sir Joseph Swan in 1885 and became technical director of the Edison Swan Electric Co. in 1913. He retired early in 1942.

We regret to record the death, on January 8, of **Mr. Vernon Walker,** M.I.E.E., who was on the technical staff of No. 2 sub-division of the North Western generating division of the B.E.A., and who had contributed numerous articles, mainly on power station subjects, to The Electrical Times. He served with electricity undertakings in Huddersfield, Nottingham, and Yorkshire before joining the Bury Electricity Department in 1911, becoming charge engineer and assistant station superintendent there prior to nationalisation. He had also been interested in the training of power station operators and was instrumental in forming one of the first "improvement classes" with the object of furthering interest in plant operation. He was the founder and hon. secretary of the Bury Engineering Society.

Mr. V. Walker

Mr. Walter Horne, A.M.I.E.E., who died at Barnard Castle recently, aged 79, served for many years with the former Long Eaton Urban District Council electricity undertaking, retiring in 1938 from the post of power station superintendent.

Mr. E. Royle, managing director of Bertram Thomas Ltd. (Engineers), died on January 19, aged 69. He originally joined the company in 1908. Mr. Royle studied at the Manchester School of Technology. He was a member and trustee of the Engineers Club, Manchester, and was well known in the industry, particularly in connection with his switchgear interests. He also served on various technical committees.

Mr. T. V. Dixon, a director of Brown Brothers (Ireland), Ltd., died on January 25, aged 58.

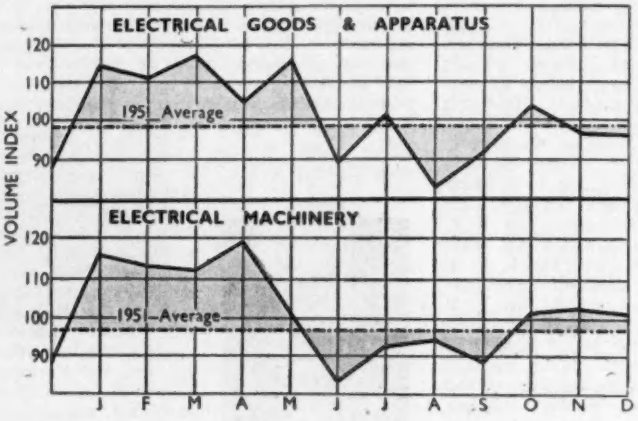
Mr. C. Lyon, who was for 30 years a director of Courtney, Pope, Ltd., died on January 25, aged 71.

Wills.—**Mr. J. E. Ellis,** formerly borough electrical engineer at Morley, left £8,367 gross (£7,779 net value).

Mr. Frederick Ryder, chairman of the Lightfoot Refrigeration Co., Ltd., left £36,751 gross (£27,908 net value).

Mr. E. C. Handcock, a former president of the Institution of Electrical Engineers in Ireland, left estate in England valued at £405.

EXPORTS AND IMPORTS



EXPORTS VOLUME INDEX

Exports of Electrical Goods and Apparatus in December last year were virtually unchanged from November, the "Electrical Times" Volume index being 96 (1950=100), compared with 97 for the previous month. Considering that this includes the Christmas period, the slight fall leaves little at which to be disappointed. In value, exports in this group amounted to £8,671,153.

Similarly, exports of electrical machinery fell by only a small amount. December's index figure of 101·5 being only one point below November's, based on 1950 as 100. Exports of machinery amounted to £5,243,662 in value.

ELECTRICAL goods exported during December last increased slightly in value, compared with the month of November, despite the Christmas holidays. For most of the items the fluctuations were small, but notable are the high totals recorded for insulated cables and the convertors, transformers and switchgear group. India alone took paper insulated cables to a value of £372,272 last month. In addition to the data given in the table, complete electric washing machines to a value of £364,208 were sent abroad in December, together with electric power tools valued at £98,814.

Description	Exports Value Month of December			Imports Value Month of December		
	1950 £	1951 £	1952 £	1950 £	1951 £	1952 £
Telegraph and Telephone Wires and Cables—						
Submarine	143,622	79,091	67,272	—	—	—
Other	642,176	341,100	628,171	—	—	—
Rubber Insulated	365,494	628,291	512,813	—	—	—
Insulated, other than Rubber	728,728	826,855	1,596,543	—	—	—
Wireless Apparatus, including Valves	1,537,605	1,662,700	1,856,983	204,560	273,181	273,083
Telephone and Telegraph Apparatus	1,170,480	1,112,798	1,488,225	—	—	—
Electric Lighting Appliances, Accessories, Fittings and Parts:—						
Filament Lamp Bulbs	102,959	120,035	73,737	21,516	10,054	7,730
Other Descriptions	265,451	393,829	414,782	36,743	39,445	64,680
Batteries (primary)	156,438	247,647	218,148	—	—	—
Accumulators, Portable	205,397	427,920	229,139	—	—	—
" Stationary	21,705	56,033	75,153	—	—	—
" Parts and Accessories	52,663	90,715	59,839	—	—	—
Electrical Cooking and Heating Appliances	295,399	475,206	278,511	—	—	—
Ammeters, Voltmeters, etc., and Parts	111,638	100,612	120,673			
House Service Meters	110,297	121,651	84,057	28,528	89,024	49,679
All Other Instruments	136,433	81,277	147,590			
Electro-Medical Apparatus	43,840	39,401	35,185	—	—	—
X-Ray Apparatus, etc.	112,713	143,511	123,139	14,559	45,334	37,253
Insulating Materials	169,334	234,993	104,974	—	—	—
All Other Articles	369,254	513,843	556,119	108,178	131,553	125,620
Total of Group	6,741,626	7,704,507	8,671,153	414,084	588,591	558,045
Electrical Machinery:—						
Generating Sets, Diesel (not exceeding 200 kW)	996,255	*237,294	363,405			
" " " (exceeding 200 kW)	165,454	130,448	269,937	30,634	80,937	7,903
Other Generating Sets	328,167	293,388	413,431			
Generators minus Prime Movers and Parts†	136,309	486,116	899,129			
Motors	744,255	788,858	812,820	18,486	31,731	30,677
Convertors, Transformers, Rectifiers, Motor Control Gear, Switchgear, other machinery	1,774,683	1,774,108	2,484,940	8,150	12,227	23,493
Fans, Electrically and Power Driven	108,003	176,478	220,875	—	—	—
Vacuum Cleaners or Electrically Operated Appliances	*350,738	513,053	281,832	—	—	—
Total Appliances and Machinery	11,345,490	12,104,250	14,417,522	471,360	713,486	620,118

* 1950 Figures include generators minus prime movers. † 1950 Figures for parts of generators only

BRITISH STANDARDS

Electrode Boilers. *B.S.* 1894 : 1952. *Price* 12*s.* 6*d.* This standard applies to boilers to design temperatures not exceeding 650° F and is concerned solely with boilers for water-heating or for the generation of steam in which the water is heated by the passage of an alternating electric current through the water, the resistance of which to the passage of the current increases the temperature of the water or generates steam under pressure. Electrode boilers differ from fuel-fired boilers in that there are no flame-swept surfaces and no danger results if the current is switched on when the boiler is empty. Apart from radiation and convection losses, the whole of the electrical energy is converted into heat.

The standard deals with materials, construction and workmanship, scantlings, inspection and testing of electrode boilers of riveted, seamless, welded, and cast iron construction. Safety valves have been dealt with at length and electrical safety devices are also specified. The formulae in this standard give in all cases the minimum scantlings and apply to boilers constructed throughout under competent supervision.

Glossary of Terms (with Symbols) relating to the Welding and Cutting of Metals. *B.S.* 499 : 1952. *Price* 21*s.* This revised standard has been issued in an attempt to cover the considerable development in welding techniques during and since the war. In order to simplify reference and correlation, the glossary has been divided into eight sections, covering different welding techniques and other aspects, including weld imperfections appropriate for radiographic examination, thus incorporating the publication previously known as B.S. 449: Part 2. Throughout sketches and line drawings are used and the scheme of symbols shows considerable advance on that given in the 1939 edition.

Electric Fuses. *B.S.* 88:1952. In our recent review of this standard we omitted to mention one important change. This is the addition of an appendix setting out dimensions for an extensive range of cartridge fuses in ratings up to 300 amperes.

Standards reviewed above may be obtained from the British Standards Institution, Sales Branch, 24 Victoria St., London S.W.1, at the prices stated.

NEW LITERATURE

Wire Reference Year Book

THIS second directory covering the wire production industry has been considerably amended to provide compact presentation together with greater ease in reference. The book's main purpose, of course, is to give a comprehensive buyer's guide. In this a geographical method of coding substitutes numbers for the names and addresses of the various suppliers who are separately listed. In the innumerable headings, wire is traced through from the rod to a wide variety of finished wire goods, wire machinery and processes being included. In addition there is a brand names section, several tables, and a bibliography on wire, which should make the volume a very useful work of reference. Published by Alfred Hinde Ltd., 192 pages, 9¼ in. by 6 in. Price 25s.

Electric Lifts

by L. J. Gooch, A.M.I.E.E.

ALTHOUGH lift engineering is a specialised job, the electrical contractor or factory maintenance electrician may often be concerned with servicing lifts. He can perform this task most effectively if he has a good grasp of the principles of lift design and construction: this the present volume is admirably designed to give. Essentially it is divided into two parts. The first gives a general description of these principles, and of the commoner forms of control and power circuits involved. In the second section, which is based on this earlier information, maintenance procedure is set out in considerable detail. Moreover, the suggestions offered are not confined to operations to be carried out. They cover also symptoms to be watched for. There is no doubt that this handbook must prove most valuable to all having occasion to consult it. Published by Marryat and Scott, Ltd., 40 Hatton Garden, London E.C.1. Second edition, price 15s.

BOOKS RECEIVED

Television and Radar Encyclopaedia, edited by W. MacLanachan. Brief notes on circuits, components and techniques. Published by Newnes, 216 pages, 8½ in. by 5½ in. Price 30s.

Transmission Lines and A.C. Networks, by T. F. Wall. Principles of design and operation. Published by Newnes, 328 pages, 8½ in. by 5½ in. Price 30s.

High Voltage A.C. Circuit-Breakers, by S. Gerszonowicz. Translation of Spanish text giving comprehensive treatment aimed at the user of circuit-breakers. Published by Constable, 454 pages, 8½ in. by 5½ in. Price 63s.

Remote Control by Radio, by A. H. Bruinsma. Covers control of models by amplitude and impulse modulation methods. Published by Cleaver-Hume Press for Philips Technical Library, 104 pages, 6 in. by 8½ in. Price 8s. 6d.

Fundamentals of Engineering Electronics, by W. G. Dow. University standard textbook on basic phenomena. Published by Chapman and Hall, 627 pages, 9 in. by 5¾ in. Second edition, price 68s.

The BUYER'S *Column*

Now a "Wee" and soon a "Big" Baby Belling

AT last full details are available of the "Wee Baby Belling," named by the makers, BELLING AND CO., LTD., Bridge Works, Southbury Road, Enfield, Middx., as the complete small cooker for everyone.

Indeed, its capacity and economy both of installation and operation will ensure its success in this country.

This stylish cooker, finished in cream and black vitreous enamel, has a 9 in. by 9¼ in. by 9¼ in. oven and a 9 in. by 7 in. grill boiler plate at the top, yet its overall dimensions are only 13¾ in. wide by 11½ in. deep by 11¾ in. long and its weight only 25 lb, which permits its placing on any shelf or cupboard top.

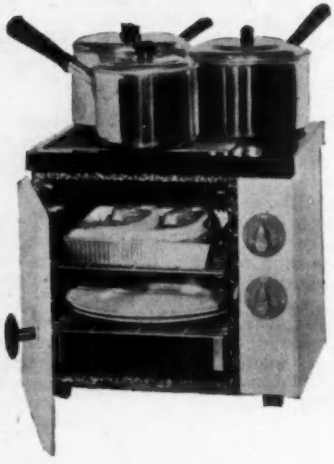
With the grill boiler plate of a new highly efficient open-radiant type consuming 1,750 W full on and the oven elements rated at 600 W full on the total loading is 2,350 W, thereby permitting its use from any 10, 13 or 15 amp power point and obviating the need for additional wiring.

Its oven is big enough to take a 4 lb joint, is heavily lagged to prevent heat losses and incorporates three-heat control and an easy to read temperature indicator. Three-heat control is also fitted to the grill boiler.

Supplied complete with baking tin and grid, two oven shelves and a deflector plate, the "Wee Baby Belling" costs only £6 19s. 6d. (no tax).

As we go to press we learn that a "Big" Baby Belling has been designed. This model is not yet in production. Details of this new No. 53 model, priced £17 10s. 0d., will be published at a later date.

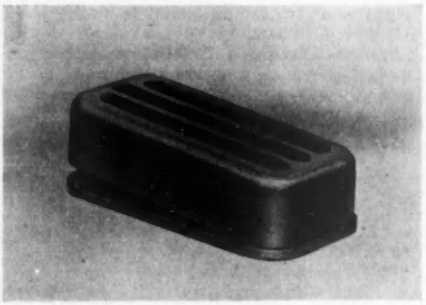
The "Wee Baby Belling" has an oven which will roast a 4lb joint



Foot Control

AN entirely new design is claimed to be apparent in the new foot switch model 523, which is manufactured by H. G. POXON ENGINEERING CO., 1, 3 and 5 Northolt Road, Harrow, Middx.

For heavy duty, the switch comprises two cast exterior casings, the upper casing being hinged at one end and operating under slight pressure the switch mechanism. This is rated at 20 amp at 250 V a.c./d.c.; it has a toggle action with q.m.b. wiping contacts and can be supplied either single-pole or double-pole. An alternative micro-switch can be supplied for light current use, a.c. only, at a reduced price.



Clever design is noticeable in this new switch

Overall dimensions of the switch are 8¼ in. by 3¾ in. by 3 in. It is fitted with rubber feet which can be screwed to the floor, is finished in durable silver grey "hammered" stove enamel and has a terminal block with earthing terminal which is readily accessible for wiring. List price is £3 8s. 9d.

Change in Materials Prices

A FURTHER increase in the price of virgin nickel effective as from January 14 has necessitated an increase pro rata in the selling prices of nickel-containing alloys, a fact which is announced with extreme reluctance by BRITISH DRIVER-HARRIS CO., LTD., Gaythorn Mill, Albion Street, Manchester 15.

In view, however, of a limited amount of process material in the firm's pipe-line, they are not increasing their own selling prices until Monday, February 2, on which day the following amended metal surcharges will apply to all material invoiced. Malleable nickel, 2s. 6d. per lb., nickel chromium 80/20, 2s. per lb.; nickel chromium 65/15, 1s. 8d. per lb.; nickel copper (advance), 1s. 11d. per lb.; thermo-couple alloys (T1 and T2) 2s. 9d. Other nickel-containing alloys will be increased pro rata.

Fuse Mastery

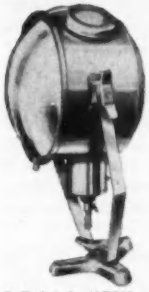
THE "Fusemaster" screwdriver which is being distributed by L. J. HYDLEMAN AND CO., LTD., 206-212 St. John St., Clerkenwell, E.C.1, has a transparent shockproof amber plastic handle and a silver steel blade which is finely ground.

Electricians, engineers and all laymen who sometimes have occasion to repair fuses will find this tool most useful, more so because ingeniously contained inside the handle of the screwdriver is a plastic spool on which is wound approximately 100 ft of 5, 10 and 15 amp. fusewire, sufficient to repair, the distributors say, at least 600 fuses. In the top of the spool, which forms the closing end cap to the handle, is a plated ring hinged at one side so that the tool can be hung by the fusebox.

All metal parts are polished and the "Fusemaster" screwdriver is supplied by the distributors packed in attractive display boxes of one dozen. The retail price is 3s. 6d. each.

R.E.A.L. "Fifty-three" Floodlantern

THIS important addition to the R.E.A.L. range of floodlanterns by ROWLANDS ELECTRICAL ACCESSORIES LTD., Hockley Hill, Birmingham 18, combines all the essentials of a high-efficiency narrow-beam projector with the new R.E.A.L. universal joint focusing device.



R.E.A.L.'s "53" is a winner

Trimmings and unessentials have been eliminated and the lantern is available in a variety of forms covering all lamp sizes from 300 W to 1,000 W, both general service and class B gas-filled types. The body is fabricated from heavy-gauge steel and finished, after anti-corrosion treatment, in high-temperature baked silver spray enamel. The reflector, 13 in. diameter parabolic, 4½ in. focus, is supplied either in lightly rimpled glass or plain polished glass.

Beam divergence: with the lightly rimpled reflector with 500 W B 2 lamp, 15°-18° or general service lamp 25°-30°; with plain polished glass using 500 W B 2 lamp. 12½° or general service lamp 22½°.

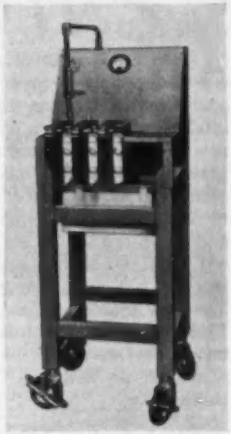
Prices: List No. 553, 500 W model with lightly rimpled parabolic reflector, 180s.; List No. 555, plain parabolic, 195s.; List No. 556, 1,000 W rimpled parabolic, 240s.; List No. 558, plain parabolic, 255s. The above can be supplied with a heavy cast-iron base and locking bar at an extra charge of 15s. each.

Ekco Solder Pencil

IT is announced by E. K. COLE LTD., Southend-on-Sea, Essex, that production of the EKCO solder pencil has been suspended through pressure of other work. It is regretted that no further supplies are available. Users of existing solder pencils are assured of full spares facilities.

Nife Topping-Up Equipment

A NEW and fully automatic topping-up equipment designed to work in conjunction with the recently introduced Nife nylon safety vent system for three-cell industrial and miners' cap lamps, is now available from NIFE BATTERIES, of Redditch, Worcs.



Speed up battery service with Nife's new equipment

The topping-up unit consists essentially of a lightly constructed wooden trolley mounted on jockey wheels for mobility and incorporating a rack for the batteries, a distilled water tank with a pump and injector and an automatic electrical control circuit.

With this equipment it is not necessary to remove the vents for the regular weekly topping-up. The operation is carried out through the central orifice of the nylon plug which is automatically opened when the cap-lamp battery lid is lifted. Distilled water only need be added as the new system has entirely obviated electrolyte leakage.

The water is pumped through a tube leading to the injection type adaptor, which has automatically centred itself on the exposed vent, and flows into the cell. As soon as the electrolyte reaches the injector needle the water supply is automatically cut off and an indication is given to the operator that the process is complete. About 120 three-cell cap-lamp batteries an hour can be dealt with in this way.

The 6-V pump is powered by the batteries receiving treatment while the indicator circuit is energised by a separate battery of small capacity.

Mary Ann "Doubleway" is back

THORN ELECTRICAL INDUSTRIES LTD., 105 Judd Street, London W.C.1, announce that the Mary Ann "Doubleway" automatic electric iron is again in production and is being distributed through their subsidiary company, Smart and Brown (Engineers) Ltd., at 8 Rose and Crown Yard, King Street, St. James's, London S.W 1, to whom trade enquiries should be addressed.

TRADE PUBLICATION

BELLS AND BUZZERS.—Leaflets available from Julius Sax and Co. Ltd., 24 Commerce Road, Brentford, Middlesex, feature the company's range of first-quality bells, buzzers, transformers and bell-pushes.

Power in Canada

Steam and Hydro Progress During the Year 1952

A RECORD total of 1,064,000 h.p. of new hydro-electric capacity was brought into operation in Canada in 1952, bringing the total installed capacity up to 14,304,230. Other new water-power projects and extensions to present plants are under construction or planned. Although the new plant figure is a record, allowing for dismantling of old plant and down-rating, the net increase is reduced to 961,726 h.p.—slightly below the 1943 figure of 988,675 h.p. when Shipshaw was completed. The new plants and extensions scheduled for 1953, however, total some 860,000 h.p., while other developments under preliminary construction or definitely planned exceed two million h.p.

British Columbia

The British Columbia Electric Co. Ltd. completed the power house at Wahleach Lake, with operation of a single unit of 82,000 h.p. under a 2,000 ft head, at the beginning of December. The set, however, is working under run of the river capacity as full storage water is not yet available. At Bridge River a fourth 62,000 h.p. unit is to be installed in 1954. Several smaller units were built for the British Columbia Power Commission, but probably the greatest scheme, the Alcan Nechako-Kitimat aluminium plant, although well up to schedule, is not yet generating. No definite plans beyond the present programme of 420,000 h.p. in three units have yet been made, despite the fact that the ultimate development is estimated at more than two million h.p.

Consolidated Mining and Smelting Co. Ltd. has made rapid progress on the Waneta development and it is hoped that the plant will be in service this year. It will initially comprise three turbines, each of 105,000 h.p., each driving a 90,000 kVA alternator. Ultimate capacity will be 420,000 h.p.

Ontario

In Ontario, the Otto Holden station, on the Ottawa River, is virtually complete, the eighth and last unit being scheduled for service early this year. This will make the total installed capacity 264,000 h.p. At Sir Adam Beck-Niagara No. 2, the major civil engineering work is well in hand and it is hoped to have the first sets of this 1,260,000 h.p. scheme operating in 1954, with completion in 1956. A third unit of 45,000 h.p. is authorised for Pine Portage, and will go into operation in the fall of 1954.

Steam plant includes the J. Clark Keith station at Windsor, which already has two 66 MW units running. The third and fourth units of this scheme are to be completed in spring and autumn of this year respectively. At Richard L. Hearn, Toronto, the initial stage consisting of two units is now in operation, and the second stage, also of two units, is well advanced, the third set having been put into operation in November of last year, while the fourth is planned for May of this year. When the plant is complete and operating on 60 c/s the four unit system will have an installed capacity of 400 MW.

Quebec

The Province of Quebec brought into operation 597,000 h.p. and has several other projects under construction. Four new units, two of 55,000 h.p. and two of 56,000 h.p., were completed and commissioned at Beauharnais No. 2 power house on the St. Lawrence River. This brings the capacity of the station up to 555,000 h.p. while that of the development is now 1,297,000 h.p. This should be increased to its ultimate value of 1,408,000 h.p. by the end of this year.

Preliminary field work is under way for the construction of a large hydro scheme on the Bersimis River, which is expected to develop about one million h.p. It is hoped that the first stage of 300,000 h.p. will be in service by the end of 1956.

The Aluminium Co. of Canada has completed the Chute-du-Diable development on the Perebonka River, and the capacity of this plant is now 275,000 h.p. A further plant down river is well advanced and will contain five units each of 55,000 h.p. Several smaller schemes are in hand by other power firms.

In the field of power distribution, construction was also very active, and new main transmission lines were completed or were under construction in many sections of the country. New transformer and sub-stations were built, and secondary lines were extended. Good progress in rural electrification was also achieved, particularly in Ontario, Quebec and Manitoba.

The WEEK in NEWS

Quiz on Administrative Costs Urged

Chamber of Commerce Request based on Out of Date Facts

ADMINISTRATIVE co-ordination between gas and electricity undertakings as a means of reducing costs, is being urged upon the Government by the Association of British Chambers of Commerce. In a memorandum sent to Lord Leathers as Secretary of State for the Co-ordination of Transport, Fuel and Power, the Association has stated that in 1950-51, over 9% of the operating costs of the B.E.A. were spent on purely administrative expenses of distribution. Comparable costs were incurred by the area gas boards.

As a result of its studies, the Association recommends that a special group of experts from industry and commerce, as well as from the supply undertakings, should be appointed to examine this problem of administrative costs in all its aspects. Meter-reading is instanced as the type of administrative function which such a committee might recommend, though this is recognised as having little effect as an isolated measure.

It is emphasised by the Association that it has no intention of suggesting integration of operating functions of the electricity and gas boards, or of stifling the competition between them.

Lord Leathers, it is understood, has informed the Association that the whole question of administrative costs in gas and electricity undertakings is receiving active consideration.

In the memorandum, costs are examined under six headings which come in the general classification "Administration and General Expenses." They include meter reading, stationery, rent, transport and salaries. It is suggested that the £23·2 million involved (£18·5 million of which is for electricity boards) is spent annually on "purely administrative functions," although the fact that some small proportion is spent on showrooms is recognised.

It is of interest to note, in this connection, that in its last report the B.E.A. stated : "a large amount of the expenditure classified under the heading 'Administration and General Expenses' relates not to administrative expenses proper, but to such matters as consumer service, training, safety and welfare, as well as meter-reading, billing and the collection of accounts."

Fireguards in Ulster

THE Heating Appliances (Fireguards) Bill, a private members' measure, was given a second reading in the Ulster House of Commons last week. It was stated that the Bill would not become law before May 1. In the meantime traders would be able to sell the majority of existing stock.

ADVICE ON FUEL FOR INDUSTRY

THE Ridley Committee recommended the formation of a fuel advisory service for industry in which industry itself would participate. We understand that the Minister of Fuel has set up a special committee, under the chairmanship of Mr. W. H. Pilkington, to study ways and means of providing such a service for the better use of fuel in industry.

MORE TALKS ON METER-READING

AN informal discussion on the suggestion to institute the scheme of joint meter-reading took place last Thursday. The talks were private and took place between representatives of the B.E.A., the Gas Council and Trade Unions. As previously reported, experiments are being carried out to ascertain the practicability of such a scheme, and it is understood that these latest discussions centred round the different scales of pay and conditions of employment in the two industries. Some time can be expected to elapse while experiments are completed—only if the system passes exacting tests will it be adopted.

The First Half-Century

Sir,—I boast of the fact that I am a practical man and have always done my best in whatever branch of the engineering profession I have been engaged in. But it seems a hopeless prospect when one sees men who have never been through the shops, having responsible posts in charge of men and machinery offered to them. In an electrical journal recently I saw the following: 'Wanted, a good fitter, to superintend erection of plant for central station, and afterwards act as resident engineer. Previous electrical knowledge essential but not necessary.' Surely after one has read about mechanical engineers for electric generating stations, one would suppose that would-be employers would have more respect for the training of men they actually want. Yours truly, Disgusted.—*From our issue of Jan.* 29, 1903.

A new showroom has been opened in Birmingham by William McGeoch and Co., Ltd. It adjoins the company's works at Bordesley and displays a comprehensive range of all types of lighting fittings, switchgear, watertight plugs and sockets, lampholders and accessories. Walls have been divided into projecting panels which, besides presenting an attractive appearance, also facilitates the division of various types of equipment and wiring

Fair Trading Council's Work Summarised

A STATEMENT issued last week by the Electrical Fair Trading Council enumerates some alterations in policy and in constitution and representation. As regards policy, it is to be noted that clause 4 dealing with the installation and resale of appliances in houses on large building estates has been deleted from Schedule 5. In the same schedule, domestic cookers of 5/12 kW have been omitted. Discounts on batteries and battery materials have been revised under Schedule 7, and those for synchronous clocks under Schedule 10 have been approved.

Activities of the Council continue to be of valuable help to the industry at home, the statement adds. They have also proved of interest and assistance to overseas industries. Most representatives of firms visiting this country, it is stated, made a point of calling on the Council's Secretary.

Another Lighting Course will be Repeated

LAST week we reported that E.L.M.A.'s Illumination Design Course held in London last autumn is to be repeated during February and March. We hear now that the same decision has been taken in Glasgow, because there too the original course was overcrowded. The Glasgow course reopens on February 12. Successive lectures—there will be two each evening—will be given on February 19 and 25, and on March 4, 12 and 19.

COURSE ON SURGES

A SPECIAL course of six lectures on "Surge Phenomena in Electric Power Systems" is to begin at The Polytechnic, Regent Street, London, on February 20. Each lecture will be delivered on succeeding Friday evenings beginning at 6.30 p.m. We note that all the speakers are members of the staff of the E.R.A. and their subjects will be presented so as to be understood by persons of average scientific attainment. Attention will be paid to the impact of research on the design and protection of lines, transformers and other plant. Fee for the course is 20s. and enrolment forms may be had from Mr. W. H. Dale, head of the electrical engineering department.

Housecraft Advisers' National Conference

OVER 300 delegates from all parts of Great Britain and N. Ireland are expected at the national conference of Housecraft Advisers and Senior Demonstrators which is being held in London between March 24 and 27. The conference is organised by E.D.A. and E.A.W.

OFFICIAL PUBLICATIONS

SAFETY IN MINES RESEARCH, 1951. *Thirtieth Annual Report* (p. 198). H.M.S.O. 2s. 6d.

BRITISH STANDARDS
B.S. 1133 : Sec. 6 : 1953. Packaging Code. *Temporary prevention of corrosion of metal surfaces (during transportation and storage).*
B.S. 1133 : Sec. 7 : 1953. Packaging Code. *Paper and board wrappers, bags and containers including films, foils and laminates.*
B.S. 1919 : 1953. Hacksaw Blades.

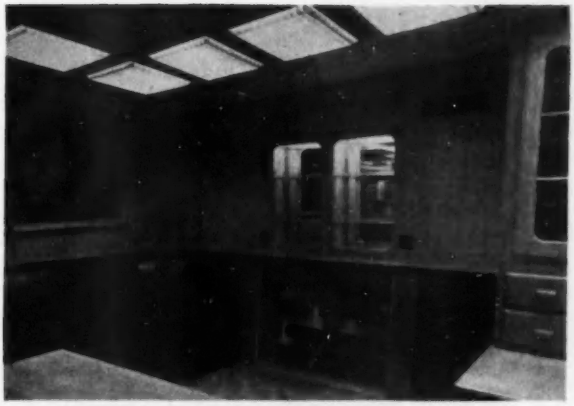
CENSUS OF PRODUCTION, Vol. 4. *Final report for* 1948 *on Electrical Engineering (General).* H.M.S.O. 5s. (see page 207).
Vol. 12. *Final report for* 1948 *on Electricity Supply Industry.* H.M.S.O. 3s. (see page 193).

LUBRICANTS AND LUBRICATION, *Govt. Research Report published for D.S.I.R. by H.M.S.O.*, 35s.

STRENGTH AND TESTING OF MATERIALS, *Govt. Research Report published for D.S.I.R. by H.M.S.O. in two parts, 55s. each part.*

E.R.A. REPORTS:
C/T108: *Selection and Characteristics of Wind-Power Sites*, by E. W. Golding and A. H. Stodhart, 7s. 4d.; G/T253: *Effect of Series Resistance on Energy Dissipated in Capacitive Spark Discharges Across Small Gaps*, by H. G. Riddlestone, 10s. 3d.; G/T267: *Flameproof Electrical Apparatus; Flanged Joints, One Inch and One Half-Inch, in Radial Breadth, in Atmospheres of Heptane-Vapour and Air*, by H. Robinson and H. L. Williams, 10s. 3d.; O/T8: *Examination of Corroded Insulator Spindles*, by G. Mole, 9s. 3d.; S/T66: *Arcing Phenomena in Unearthed High-Voltage Systems—Critical Resumé*, by S. Silbermann, 24s. 4d.; S/T70: *Design, Construction and Performance of New High-Speed Cathode-Ray Oscillograph for Recording High-Voltage Surges*, by E. L. White, 12s. 3d.

U.N. SCIENTIFIC CONFERENCE, Vol. 3. *Fuel and Energy Resources*, H.M.S.O. 22s. 6d. Vol. 4. *Water Resources*, H.M.S.O. 32s. 6d.



Recessed fluorescent lighting fittings in the yacht "Aries"

Electricity Aboard the Yacht "Aries"

IN our January 1 issue we noted a few details of the electrical installation aboard the recently completed £60,000 yacht *Aries*. Further information on this luxury vessel is now to hand. A main electricity supply comes from two 20 kW d.c. generators and a 185 a.h. battery, and an auxiliary ring main at 115 V, 60/s for American domestic equipment. There are also facilities for the reception of a shore supply at 230 V or 115 V a.c. or 220 V d.c. Among the electrical equipment fitted are an air conditioning system, refrigerators, electric cookers, washing machine and salt and fresh water heating systems. There is also a radio telephone, radiogram, cinema and dictaphone besides the lighting. Filament lighting has been used on a generous scale, but in some cases fluorescent lamps were employed. In the saloon, for instance, recessed louvered fittings were requested despite the fact that there was only 2½ in. of available space. 14 W lamps were specially made by the British Thomson-Houston Co., Ltd., to run off the 220 V d.c. supply, being mounted in threes in eight recessed fittings.

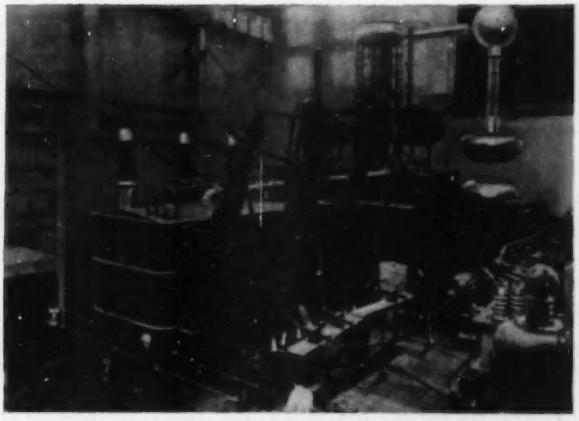
Electricity or Gas in Council Houses?

THE question of whether to install electricity or gas or both in new council houses has appeared again, this time in the form of a discussion among members of the Eastern Gas Consultative Council. The problem is one that faces local authorities, and may be regarded as almost insurmountable. Faced by the need to effect economies many councils are tempted to build all-electric houses, because electricity is used exclusively for lighting and radio services, and if provision is also made for cookers, etc., charges made by electricity authorities are decreased.

Gas authorities are, however, perturbed lest councils adopt all-electric houses in order to cut costs. Gas Consultative Council chairman, Mr. R. Turner, said if electricity charges were raised to an economic figure for cooking and heating, it might result in gas being used for those purposes, thus enabling electricity boards to conserve energy, avoid load-shedding and secure a more economic use of coal. If both continued the present policies of competing on new estates, when, he asked, would one give way? Mr. Turner also asked whether the Minister would stand by and watch the extension of the electricity supply in the event of the Gas Board deciding that it is no longer a paying proposition to install a gas supply on future housing estates?

Canada's Water Flow

HYDROMETRIC investigations on the Canadian rivers and streams in the St. Lawrence and Southern Hudson Bay area are the subject of a 430-page bulletin just issued by the Department of Resources and Development. Data relates to climatic years 1947-48 and 1948-49.



The first of six 120 MVA transformers for the B.E.A.'s 275 kV grid on test in the Rugby works of the manufacturers, the British Thomson-Houston Co., Ltd. This unit is suitable for ±15% voltage variation by on-load tap-changing equipment at the 132 kV terminals. It is destined to be one of two transformers installed at the Staythorpe sub-station

Fluorescent Scheme for Buses

FOR some two-and-a-half years now trials have been going on at Reading involving a new method of operating hot cathode fluorescent tubes for the interior illumination of trolleybuses. Fluorescent lighting of vehicles is not new, but hitherto it involved the use of rotary invertor or vibrator to derive a.c. from the battery. Now a 64 V battery has been provided and current is supplied direct, under the system developed by the G.E.C., C.A.V., and Mr. W. J. Evans, the town's transport manager. The battery is charged by a C.A.V. overhung generator, specially wound, and a control board with suitable regulator has been fitted so that the legal lighting load is balanced on a 3-wire system and normal 32 V lamps used for external lights.

There are ten fittings on each deck, semi-recessed, and built with clear reeded Perspex covers. Control gear has been fixed to the back. Front and side destination boxes have also been fitted in this way, but it was found impracticable to do the same at the rear. The rear platform has a flush fitting housing one tube. About twice the amount of light has been provided, we understand, without any increase in load, and without glare.

Top deck of the experimental Reading trolleybus equipped with a new fluorescent lighting system. Due to low voltage special tubes, 15 in. long and 1 ½ in. in diameter were employed, each rated at 14 W. There are five fittings on each side of the deck

E.A.W. ACTIVITIES

Award of Prizes

ANNUAL awards to women gaining the highest marks in the Home Workers' Examinations for Housewives during 1952, have been announced by E.A.W. The sum of £100 was raised by the Association's Cheltenham branch for the purpose of making these awards, to mark their silver jubilee. The first prizes to be presented go to Miss D. Styles of Derby, £5; Mrs. Gamlen of Brighton, £3; and Mrs. Eastlake of Cheltenham, £2. The Councillor Miss Walter Rosebowl, given to the schools gaining the highest average marks over the year among schoolgirl candidates for the Home Workers' Certificate, has this year been won by the County Technical School, Tonbridge. Last year's winners, S.E. Essex County Technical School, Dagenham, were runners-up.

Teachers' Conference

LAST autumn the E.A.W. broke new ground by holding a one-day conference on the teaching of electrical housecraft in Yorkshire. That conference was the first of a new series and we now hear that the second in the series is to take place in Bath on March 14. It is being arranged specially for teachers in Somerset and neighbouring counties. The syllabus will include sessions on the Use and Care of Cookers, Cooking Equipment and Refrigerators, Laundry Equipment, and the Teaching of Housecraft in Schools.

Full information may be had from E.A.W.'s London headquarters, and applications to attend should be made by February 21. Fee for the conference will be 7s. 6d. Previous one-day conferences have taken place in Gloucestershire, Glasgow and London.

Floodlighting scheme using existing steel lattice towers installed by Benjamin Electric Ltd. at King George V Dock, London. Thirty Duoflux units housing 1,000 W lamps were employed, each floodlight consisting of two reflectors. The main reflector is shovel-shaped, directing light forwards and downwards, while the secondary reflector gives increased distance to the light flow. Scheme was carried out by Electrical Installations Ltd.

NEW MARKER BUOY FOR WHALES

THE electrical industry is at present playing a large part in the development of the whaling industry. Apart from the introduction of electric harpoons, the marking of whales, caught and awaiting recovery, has received attention, and a prototype buoy produced by Venner Ltd. This new buoy is a lightweight scaled-down version of the company's standard radio transmitting dahn buoy, but made of an aluminium alloy. It weighs only 65 lb and it is hoped to reduce this by a further 10 lb. The reduction has been effected by shortening the time of transmission from the standard 72-hour period to 22 hours, and this, plus the use of light alloy construction, facilitates manipulation by one man. No other alteration on standard performance has been made—the 30-mile transmitting range is unchanged and the variation of delayed operation by time switch is retained.

Venner Ltd.'s new marker buoy for the whaling industry now being used off S. Georgia

Repair of Appliances in Council Houses

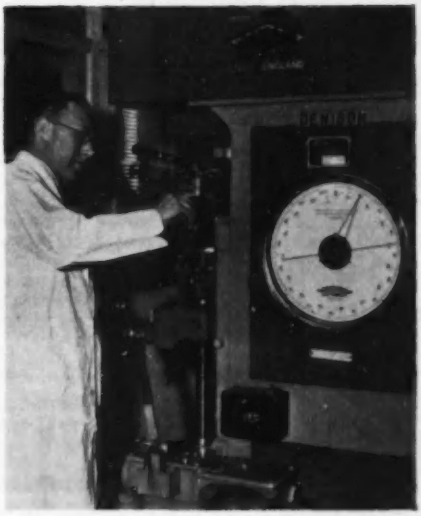
LATEST local housing authority to become perturbed at their bills for repairs to electrical appliances in council houses, is Aberdeenshire. At a meeting recently it was decided to investigate reports of damaged articles and if it was found that the damage was caused by negligence, tenants would be held responsible. A number of views were expressed both for and against making tenants foot the bills. One member thought there was a need to instruct women in the proper use of electrical equipment.

E.D.A. at Building Centre

A WELL illustrated pamphlet has just been issued by the E.D.A., as guardians of the electrical section at the Building Centre in London. The various parts of the exhibit and their purpose is fully explained, and the booklet acts as an admirable guide to visitors.

"Welded Fabrications"

A NEW 68-page catalogue entitled "Welded Fabrications," admirably produced and extensively illustrated, has just been compiled by Robert Jenkins and Co. Ltd. It is explained that the whole of the firm's activities cannot be covered but due emphasis has been laid on a wide range of manufactures and of industries served, and lately installed plant required to meet increased demand. This demand, it is stated, is still in excess of the company's productive capacity.



Testing an alloy with a Denison tensile testing machine at the recently opened laboratories of Hoover (Washing Machines) Ltd. at Merthyr Tydfil. These new laboratories have been equipped with up-to-date apparatus for metallurgical and chemical research and modern investigation

NEWS IN BRIEF

Series of four lectures on the principles of TV broadcasting and large-screen TV reproduction is being arranged by the British Kinematograph Society. The lectures will be given in Liverpool.

All fireguards should be made with a clip or spring to fix them to fireplaces, said Newcastle coroner at an inquest recently.

Report of the conference on industry and the universities held last September has now been published in book form by the F.B.I. (price 4s. 6d.).

Annual luncheon of Electrical Trades' Commercial Travellers Association is to be held at Connaught Rooms, London, on February 20. Tickets are 16s.

Ekco players presented the pantomime *The Tinder Box* each evening during the week ending January 17.

Elliott Bros. Long Service Association, for men with over 25 years' and women with more than 20 years' service, held their annual dinner recently when 89 members were present.

Last week the B.E.A. Headquarters Sports and Social Club presented the Portland Players in *Murder Out of Tune*, by Falkland Cary at the Cripplegate Theatre, London.

Questions in Parliament . . .

Unsold Goods

Among the early questions asked on the resumption of parliamentary activities was that of Mr. Osborne who wanted to know when the report of the Committee appointed to consider rebates on unsold retail goods would be available. The Chancellor said he expected the report in the near future. He was anxious to see it as soon as possible.

Payment of Contractors

A point raised by Mr. Grimond concerned prompt payments by local authorities to building contractors engaged on public contracts. Asked to give figures showing how far behind some authorities were, Mr. Marples said such information was not available, but there was no reason why such payments should be owing. He said he hoped publicity would be given to his reply because moneys due from time to time under the contracts should be paid promptly and certainly within the period named in the contract. Those were instructions given in a Ministry circular last April, which local authorities should obey.

Expenditure of Nationalised Industries

The Chancellor of the Exchequer declined to give information on expenditure of the nationalised industries. He said the practice of not disclosing those amounts was started in 1951 and he saw no reason to depart from it now. The question sought similar information as regards the G.P.O., which information had been given in the Estimates, said the Chancellor.

Atmospheric Pollution

In a written answer, the Minister of Housing and Local Government stated that there were 186 stations set up in England and Wales by local authorities for the assessment of atmospheric pollution. The question also specifically referred to Lancashire, and the figure in that county was 32.

Building Costs Report

Asked when the second report of the Scottish Building Costs Committee would be available, Mr. J. Stuart said that as part of economy measures the Committee had been asked not to proceed with their comprehensive inquiries. Instead of producing a report therefore, the Committee had supplied material which would be of valuable assistance.

Industry in the West Indies

The report of a party of British industrialists who visited the West Indies to look into the possibilities of further industrial development there, was expected to be ready in a month or so. The question of publication would then be considered, stated Mr. Oliver Lyttelton in a written answer.

Electrification in Wales

Electricity supply to Wales was discussed at some length during the annual debate on Welsh Affairs, which was held in the House of Commons last week. The two topics which attracted most attention were the slow rate of rural electrification in South Wales, and the room-based domestic electricity tariffs. In his reply to the debate, the Home Secretary and Minister for Welsh Affairs, Sir David Maxwell Fyfe, admitted that the figures regarding rural electrification disclosed a serious problem. He thought the main trouble was the previous backwardness of South Wales in this respect and the lack of any high tension network on which a scheme could be based. The completion of a 132 kV line from Carmarthen Bay to Carmarthen should help matters here, and there was a £12 m scheme for the provision of necessary mains and transformers.

With respect to charges, he pointed to the Consultative Council's eventual acceptance of the room basis as preferable to any other, and to the Board's undertaking to review the working of the new tariff after a year's experience.

The main comment on electrical matters had come from Mr. R. Bowen (Cardigan), who compared the total spent on rural electrification by the South Wales Board during the last year unfavourably with that spent by all other English and Welsh boards. He said that it was even less than in the previous year, and went on to dismiss, with figures, any suggestion that the limitation had been on account of restrictions in capital expenditure. The Board, he alleged, had received spending authority for rural electrification work to the limit for which it had asked. The whole problem was a matter for the Ministry of Fuel and Power.

Other members expressed pleasure at the restriction of the B.E.A.'s hydro-electric schemes in Wales, mainly from the amenities viewpoint.

Atomic Power Stations

Work was going ahead at Harwell and Risley on the design and development of a full-scale breeder reactor, capable of producing substantial amounts of electricity, and a suitable site was being sought for the construction of that plant, said Mr. Duncan Sandys, Minister of Supply, in a statement on atomic energy for industrial use in the House of Commons on Monday. A natural uranium reactor moderated with water, was also being constructed, which would produce a much more intense flow of neutrons than was possible at present. Although that plant would not be used for the generation of power, it would, however, greatly expand the quantities and variety of radioactive isotopes which could be used for industrial and scientific purposes.

Mr. Sandys said it was too early to say how soon electricity generated from atomic energy would be available on a significant scale for industrial pur-

poses. It should not be imagined, he said, that nuclear reactors will supersede existing methods of producing electric power, but if technical problems are successfully solved and the new methods proved economical, there was no reason why nuclear reactors should not before very long provide a useful additional source of industrial power.

Earlier, the Minister had stated that production of electric power from atomic energy had raised numerous problems which had been studied in the light of experience gained with graphite piles at Harwell and Windscale. They had also benefited from discussions with Canadian experts about results obtained in the operation of heavy water reactor at Chalk River, Ontario. The most certain method of generating power was to build an improved type of natural uranium reactor enclosed in a pressure shell, the heat produced being transferred by a gas under pressure through a heat exchanger to a conventional power generator.

Pensions in Supply Industry

A number of questions were put to the Minister of Fuel and Power concerning the granting of pensions to retired officials previously employed in local government electricity undertakings, equal to those now given under the Pensions (Increase) Act, 1952. The Minister said he was not in a position to make a statement on the matter at present, but promised to do so as early as possible. Explaining the apparent delay, Mr. Lloyd said he had had to consult with the B.E.A. and Gas Council, and they in turn had to consult their Area Boards.

Load Controlling Devices

In a written answer on Monday, Mr. Geoffrey Lloyd referred to the joint study of possible uses of various load controlling devices which Ministry officials and representatives of electricity boards had recently completed. Asked when the results of this inquiry would be published, he said the purpose was to advise the Minister and B.E.A. and not to prepare a document for publication.

Fuel Saving Installations

Asked whether discussions had taken place as to the assistance of manufacturers in the making and installation of fuel-saving devices, Mr. Geoffrey Lloyd said that he had consulted the Minister of Supply who had assured him that present supplies of steel should be sufficient for the manufacture of these installations.

Company Activities . . .

Edgar Allen and Co.

Meetings have been called for February 5 to effect the 100% share distribution by way of capitalisation of reserves, for which consent of the Treasury has already been obtained.

Lindley Thompson Transformer (Holdings) Ltd.

The full accounts of this concern for its first year as a public company show that the trading profit for the period to September 30 last is £64,678. After depreciation, taxation, etc., the net profit is £22,677. Taxation alone absorbs £40,961—over 64% of the profit figure. The sum of £15,000 is placed to factory extensions, £3,000 to plant and machinery, and £4,000 to deferred repairs. Reviewing future prospects, Mr. J. Lindley Thompson, chairman, says that a good order book has been built up, sufficient to employ the company fully for the next 12 months.

Marco Refrigerators Ltd.

There is to be no final dividend—there was also no interim—for the year ended September 30 last. The directors report a group net loss of £15,054 for the year, compared with a net profit of £11,401 for the previous 12 months. They attribute the trading loss to the adverse trading conditions brought about by the closing down of certain export markets, and the reductions in the home trade caused by restriction of credit facilities. The net loss figure is arrived at after charging taxation of £1,282. After payment of the full dividend on the £100,000 5½% Cumulative Redeemable Preference capital, the credit balance carried forward is reduced from £61,028 to £43,086.

Stream-Line Filters Ltd.

In spite of the disturbance of manufacture arising from the cancellation and deferment of export orders, both direct and through engine builders and electrical equipment manufacturers, due to import restrictions, the results for 1952 appear to be quite satisfactory, stated Mr. C. S. Garland, chairman, at this meeting last Saturday. The order books of the parent and subsidiaries provide full employment of all factories for more than a year ahead, he said, adding that the present scale of profits must be regarded as exceptional.

Tube Investments Ltd.

It is announced that £40,451 Ordinary stock (ranking *pari passu* with existing Ordinary stock) has been issued in exchange for acquisition of the whole of issued capital of Brookes (Oldbury) Ltd.

Turner and Newall Ltd.

The proposal to increase the authorised share capital to £20 million, and capitalise reserves of £5,338,609 to permit the issue of one £1 Ordinary share for each £1 unit now in issue, was approved at last Thursday's meeting.

Electric Supply News . . .

Glasgow

To reinforce the supply in the north-west area of Glasgow, the South West Scotland Electricity Board has approved a scheme, estimated to cost £836,400. Under the scheme, which is designed to relieve the load on the Dundas substation, a new 132/33 kV substation will be constructed at Killermont. Transformer feeders will be laid to Maryhill, Kelvinside and Partick, where 33/6·6 kV substations will be established.

Hexham

A public meeting has been called for February 7, by the local M.P., Mr. R. Speir, at the request of the South Northumberland branch of the National Farmers Union to further consider the proposal of the B.E.A. to erect a 275 kV grid line from Stella to Carlisle which would pass through the area. On the strength of evidence collected at the meeting, representations may be made to the Minister of Fuel and Power. The route of the line has been approved by the Ministry, but farmers who maintain that valuable farm land will be interfered with, have threatened to withhold wayleaves. The meeting between farmers and amenity societies is to try to reach agreement on an adjustment of the route for submission to the Authority.

Merseyside

Detailed proposals for the third stage of rural electrification of the Merseyside and North Wales Electricity Board were given by Mr. J. Eccles, chairman of the Board, to the area Consultative Council, last week. With the 16 sections now suggested for development in the third phase, one quarter of the whole section into which the area had been originally divided in 1948, would either have been developed or be in course of development. The work would be completed in each of the counties at approximately the same time. In the six months ended September 30 last a further 430 farms and 3,945 other premises were connected in the development area. In later discussion a member suggested that Anglesey was perhaps the most backward, electrically, of all Welsh Counties. The chairman, Mr. J. Evans, pointed out that for one plan alone, to supply 18 farms, would involve an expenditure of £10,000. Therefore, it was felt that such expenditure could be better utilised to provide electricity for the more thickly populated areas of Monmouth. The Board were offering to supply all areas below an altitude of 600 ft.

Midlands

The area Consultative Council is informing the Midlands Electricity Board that it views with alarm the diversion of £70,000 from rural electrification schemes in Shropshire and Herefordshire to provide a power supply to an armament project near Hereford. This was agreed upon at the consultative council meeting last week, when it was suggested that such a protest might strengthen the hands of the Board in any representation it made for a compensatory increase in the grant for rural schemes.

Newcastle

A public enquiry is to be held on February 5, arising from the dispute between a Newcastle businessman-farmer and the North Eastern Electricity Board. The former has refused to allow the Board to take a power line over his dairy farm at Kipperlynn, Stocksfield. The dispute has its origins in a request from this particular farmer for a supply of electricity to be brought from the proposed new power line to his grass-drying plant—a distance of about 35 yards, apparently. When he was told the charge for this would be £650 as it involved the installation of a step-down transformer, he objected. As other farmers have complained about charges, the farmer, jointly with the landowners, decided to force an enquiry by refusing to allow the line to pass over the farm.

Southern

Proposals for standard commercial tariffs, to be introduced by the Southern Electricity Board, were placed before the area Consultative Council last week. These new tariffs have been so framed as to provide approximately 12½% more revenue than is obtained from the present tariffs. There is a block tariff providing for the primary units to be charged at 5½d. p.u., with a reduction to 1d. p.u., and a maximum demand tariff. One member asserted that the proposed new tariffs would mean an increase of 70% to one college.

LIGHTING SCHEMES

Appleby.—The Highways Committee is to investigate and report on the possibility of changing over all street lighting from gas to electricity.

Burntisland.—Burgh surveyor to prepare a report and scheme to install modern lighting in the trunk roads through the town, with a view to the work being carried out in stages over three years.

Cockermouth.—The Rural Council is to carry out a review of street lighting.

Leatherhead.—A scheme is proposed involving the installation of sodium lamps on major roads and the conversion from gas to electricity, estimated to cost £38,000.

Malden and Coombe.—The Highways Committee has proposed a £6,141 scheme for sodium discharge lighting in Coombe Lane and Traps Lane.

Maybole.—T.C. has approved a scheme for new lighting on the trunk road through the town, at a cost of over £3,000.

Commercial Information

CONTRACTS OPEN

HOME

Jan. 30.—Belfast. Wiring for electric light and power and supply of fittings at Stormont Presbyterian Church. Architects are T. T. Houston and Co., 26 College Gdns., Belfast. Deposit £3 3s.

Jan. 30.—Belfast. City's Electricity Dept. is inviting tenders for various materials, including time switches, distribution transformers, cables, switchgear, lamps, washboilers, kettles, etc Dept. is at East Bridge St., Belfast. Fee 10s. (See Jan. 8 issue.)

Jan. 30.—Bethnal Green B.C. Electric lamps included in list of items required during year beginning April 1. F. H. Bristow, Town Clerk, Town Hall.

Jan. 30.—Haltemprice U.D.C. Supply and erection of two submersible vertical spindle "Fullway" centrifugal pumps (375 g.p.m.) with electric motors, starters, control gear, etc. Engineer and Surveyor, Anlaby House, Anlaby, E. Yorks. Deposit £2.

Jan. 30.—Leeds. Supply, erection and maintenance of two vertical spindle centrifugal borehole pumps (125 g.p.m.) with electric motors and switchgear. General Manager and Engineer, Waterworks Dept., Civic Hall.

Jan. 31.—Edinburgh. Installation of lighting and power points and electric lift in third section of extension scheme at Heriot-Watt College. Applications by above date to J. Y. White, Clerk to Governors, Chambers Street.

Jan. 31.—Lancashire. Electrical installation at Nelson College of Further Education. Applications by above date to County Architect, County Hall, Preston.

Jan. 31.—Prestwich T.C. Lamps and other electrical equipment wanted during year ending Mar. 31, 1954. Borough Engineer, Town Hall.

Jan. 31.—Salford. Supply of all kinds of street lighting equipment, including concrete columns, lanterns, lamps, cables, etc., required for year beginning April 1. Street Lighting Superintendent, Bloom St., Salford 3.

Jan. 31. — Sevenoaks U.D.C. Re-wiring in screwed conduit throughout swimming and slipper baths. Engineer and Surveyor, Council Offices, Argyle Rd. Deposit £2 2s. (See Jan. 1 issue.)

Jan. 31. — West Lancashire R.D.C. Supply, erection, etc., of 53 sodium lighting units on concrete columns along (approx.) 1,810 yd of Liverpool-Preston Rd. at Maghull. R.D.C. Office, 52 Derby St., Ormskirk. Deposit £2 2s. (See Jan. 1 issue.)

Jan. 31.—Worthing T.C. Supply of flashing beacon assemblies. Borough Engineer and Surveyor, Town Hall.

Feb. 2.—Gillingham (Kent) T.C. Annual contracts include supplies of switches, conduit, wire, cables and accessories, cooker, wash boiler and fire spares, and electric lamps. Borough Engineer and Surveyor, Municipal Buildings.

Feb. 2.—Maidstone T.C. Re-wiring and replacement of fittings in 43 houses in Cherry Orchard Way. Borough Surveyor, Palace Ave.

Feb. 2.—Ormskirk U.D.C. Re-wiring of electrical installation and services at R.N.A.S. Camp, Burscough. Surveyor to Council, Council Offices, Burscough St. (See Jan. 15 issue.)

Feb. 2. — Salford. Complete electrical installation in 36 flats in Devonshire Rd. City Engineer and Surveyor, Town Hall. (See Jan. 15 issue.)

Feb. 2.—Stoke-on-Trent. Supply of electric lamps required during six months ending Sept. 30. City Surveyor, Town Hall.

Feb. 3.—Liverpool. Wiring of Ward 17 at Sefton General Hospital. Garnet Chaplin, Secretary, S. Liverpool Hospital Management Ctee., Sefton General Hospital.

Feb. 4.—Southwark B.C. List of supplies for annual contracts includes electric lamps. Town Hall, Walworth Rd., S.E.17.

Feb. 4.—Poplar B.C. List of supplies required for year beginning April 1 includes electric lamps. Particulars from Town Clerk, Town Hall, Bow Rd., E.3.

Feb. 5.—Co. Down. Electrical installation in Ballyholme primary school. W. D. R. and R. T. Taggart, architects and civil engineers, 36-38 Castle Arcade Buildings, Belfast. Deposit £3 3s.

Feb. 7.—Lichfield. Rewiring public library and museum. Leslie Straw, city engineer and surveyor, Guildhall.

Feb. 7.—Mitcham T.C. Electric lamps included in list of supplies wanted during year beginning April 1. Borough Engineer and Surveyor, Town Hall.

Feb. 7.—Newburn (Northumb.) U.D.C. Electrical installation in 130 houses on West Denton estate. Surveyor is J. A. Weatherley.

Feb. 7.—Swansea T.C. Supply of electric lamps for public lighting for 12 months from April 1. Borough Engineer and Surveyor, Guildhall.

Feb. 9.—Buckinghamshire. Applications invited for inclusion on list of contractors, from those not already on the list, in respect of heating and ventilating installations, and electrical work. Names to County Architect, County Offices, Aylesbury.

Feb. 9.—Preston T.C. Electrical installation at Larches Hostel. Borough Engineer and Surveyor. Deposit £1.

Feb. 9.—Stepney B.C. Installation of lighting and power points and two lifts in 56 flats and 8 shops on Bancroft Rd. estate. Borough Engineer and Surveyor, 227-233 Commercial Rd., E.1. Deposit (in case of lighting and power points) £5.

Feb. 10.—Portsmouth. Supply and fixing of 56 flasher units and illuminated beacons at zebra crossings. City Engineer, 1 Clarence Parade. Deposit £2 2s.

Feb. 10. — Shoreham-by-Sea U.D.C. Provision and erection of 71 concrete columns, sodium lanterns and auxiliary equipment for street lighting in Old Shoreham and Brighton Rds. Engineer and surveyor, J. Dunn, 31 John St. Deposit £2 2s.

Feb. 12.—Co. Down. Electrical installation in kitchen at Abercorn primary school. A. N. Irens, consulting engineer, Bennett Building, 46 Donegall St., Belfast. Deposit £3 3s.

Feb. 13.—Huddersfield T.C. Supplies of tungsten filament, mer-

cury and sodium lamps and cable required during year ending March 31, 1954. Borough Engineer and Surveyor, High St. Buildings.

Feb. 14.—Fife. Electrical work in erection of police station and houses at Cowdenbeath. Wilkinson and Lowe, quantity surveyors, 2a Chalmers St., Dunfermline.

Feb. 14.—Harrogate T.C. Supply of electric lamps required during year from April 1. L. H. Clarke, Borough Engineer and Surveyor, Municipal Offices.

Feb. 16.—Blackpool T.C. Supply of mercury arc rectifier transformer and switchgear equipment. Documents from General Manager, Corporation Transport, Blundell Street.

Feb. 16.—Cookstown (N.I.) U.D.C. Electrical installation in new town hall. Documents from A. Montgomery, Town Clerk, Council Office, Molesworth St. Deposit £5.

Feb. 16. — Manchester. Rewiring and additions to electrical installation at Buglawton Hall special school, near Congleton. City Architect, Town Hall. Deposit £1 1s. (See Jan. 15 issue.)

Feb. 16.—Salford. Electrical installation at Frederick Rd. Depot of City Transport in preparation for conversion of supply from a.c. to d.c. Full details from General Manager and Engineer, Salford City Transport, Frederick Rd., quoting ref. E.1.

Feb. 17.—Poole T.C. Following materials wanted during year ending March 31, 1954: cables, conduit wiring accessories, lamps, water heaters street lighting lanterns and concrete columns. J. R. Barron, Borough Engineer and Surveyor, Municipal Buildings.

Feb. 18.—Norwich. Supply and installation of 106 concrete columns, lanterns and ancillary works for street lighting on North Park Ave. estate. 55 of lanterns for 100 W tungsten lamps and 51 for 45 W sodium lamps. City Engineer's Office, City Hall. Deposit £2 2s. (Advertised in this issue.)

Feb. 18. — Wandsworth B.C. Applications invited for names of contractors to be placed on Council's list for works up to and over £500. Documents from Borough Engineer, Municipal Buildings, S.W.18. (See Jan. 22 issue.)

Feb. 26.—Dewsbury T.C. Supply of various street lighting equipment, including lanterns, lamps, cables, brackets, control gear, columns. C. H. Midson, Street Lighting Engineer, 27 Battye Street. (See Jan. 22).

Mar. 4.—Manchester. Supply and erection of four centrifugal pumps with electric motors, automatic switch and control gear, etc., for Poundswick B Booster station. Secretary, Waterworks Offices, Town Hall. Deposit £1 1s.

Mar. 9.—Eton R.D.C. Manufacture and installation of seven sets of electrically driven vertical unchokeable sewage pumps with ancillary equipment, for three stations in Denham drainage scheme. Consulting Engineers, John Taylor and Sons, Artillery House, Artillery Row, Westminster. Deposit £5.

Mar. 10.—Thurles U.D.C. Supply and installation of duplicate electrically driven pumping plant at Lady's Well. Nicholas O'Dwyer, Consulting Engineer, 6 Burlington Rd., Dublin. Deposit £5 5s.

No date stated.—Jarrow T.C. Applications invited from suppliers of electrical materials and contractors to be placed on list to whom invitations to tender will be issued during year ending March 31, 1954. Borough Engineer, Town Hall.

No date stated.—Buxton T.C. Electrical installation in 48 houses on Victoria Park estate No. 2. A. C. W. Ryland, borough engineer, Town Hall.

No date stated.—N. of Scotland H.E. Board. Erection of 132 kV line between Brechin—Bridge of Dun. Applications to Kennedy and Donkin, Alliance House, 12 Caxton St., London S.W.1. Deposit £2 2s.

No date stated.—Bristol. Contractors willing to supply lamps and other electrical materials during 12 months ending March 31, 1954, to Hortham-Brentry Hospital Group Management Committee, are invited to submit names to J. Fellows, secretary, 11 Regent St., Clifton.

OVERSEAS

*Details of items marked * may be obtained on application to the Board of Trade, Horseguards Avenue, S.W.1, quoting reference.*

Feb. 13.—Greece. Social Insurance Inst. invites tenders for supply of 125 electronic hearing aids. Inst. is at 22b Churchill St., Athens. B.o.T. (Ref. CRE 2964/53).*

Feb. 18.—India. Supply of train lighting dynamos—some 150—to various specifications re-

Your Queries Answered

"Verigraph" charts, suppliers of? M.N.—Foxboro-Yoxall, Ltd., Lombard Rd., Morden Rd., S.W.19. (248618)

"X-ray" lighting fittings, makers of? M.A.—These were produced by the Curtis Lighting Co., a firm which went out of business a number of years ago. The Edison Swan Electric Co., Ltd., 155 Charing Cross Rd., London W.C.2, make a very similar range of fittings. (248629)

Floodlighting, external, suppliers on hire for the Coronation? E.S.—Strand Electrical and Eng. Co., Ltd., 29 King St., W.C.2. (24836)

"Royal" vibrator, agents for? S.W.—L. G. Hawkins and Co., Ltd., 30-35 Drury Lane, W.C.2. (24849)

Floodlights, marine type, makers of? S.B.—Telford Grier Mackay and Co., Ltd., 11 Fairley St., Glasgow S.W.1. Clarke Chapman and Co., Ltd., 112 Fenchurch St., E.C.3. (24857)

"M" thermostats, makers of? T.E.—Robert MacLaren and Co., Ltd., 110 Kilbirnie St., Glasgow C.5. (24865)

"Maymere" fires, suppliers of spares? L.E.—Try W. T. French and Son, Ltd., Browning St., Ladywood, Birmingham. (24879)

The above are selected from questions we have answered this week. If you have a query, send it to us.

quired by Director General of Supplies and Disposals, Shahjahan Rd., New Delhi. B.o.T. (Ref. CRE 3132/53).*

Feb. 23.—Thailand. Supply of 3,000 metres of underground armoured telephone cable for Railways Organisation of Thailand, Bangkok. B.o.T. (Ref. CRE 2936/53).*

Mar. 3.—Uruguay. Supply of some 455,285 metres of lead-covered cable of various types and capacities required by Usinas Electricas y Telefonos del Estado, Montevideo. B.o.T. (Ref. CRE 2716/53).*

Mar. 12.—Australia. Supply of considerable quantities of l.v. high rupturing capacity fuse cartridges, carriers and bases, for Sydney County Council, Queen Victoria Building, George St., Sydney. B.o.T. (Ref.: CRE 1289/53).*

Mar. 17.—Uruguay. Supply of transformers and other electrical materials for substations. Usinas Electricas y Telefonos del Estado, Montevideo. B.o.T. (Ref.: CRE 155/53).*

April 28.—India. Supply of some 750 electric fans of various types for railway carriages. Directorate General of Supplies and Disposals, Shahjahan Rd., New Delhi. B.o.T. (Ref.: CRE 2164/53).*

May 6.—South Africa.—City of Capetown Electricity Dept. requires supply of 66 kV and 33 kV cables, jointing material and ancillary equipment. B.o.T. (Ref.: CRE 760/53).*

PRICE OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	285 0 0	—
LEAD, good soft pig (foreign)	97-97½	112 0 0
" "English" quality	98½-98¾	
TIN (99·75%) (Cash)	958-962	—
" (3 months)	943-943½	—
ALUMINIUM, commercial purity (del.)	166 0 0	—
ZINC	85½-85¾	100 0 0
ARMOURING:		
Galv. Steel Wire (0·104 in.)	52 0 0	—
Mild Steel Tape (0·04 in.)	39 15 0	—

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

Colesco Ltd., 29 Abbeygate St., Bury St. Edmunds. Electrical, mechanical, marine, constructional, internal combustion and general engineers, etc. Cap.: £2,000. Dirs.: D. L. Coles and Hilda E. Coles.

Robert Dobson and Co., Ltd. Civil, mechanical, electrical and general engineers, etc. Cap.: £1,000. Dirs.: not named. Subs.: Miss M. E. Dobson, 22 Bridge Rd., Stevenage, Herts, and F. W. Gowdrill, Abbeville, Todds Green, Stevenage, Herts.

Format (London) Ltd. Mechanical and electrical engineers, etc. Cap.: £100. Dirs.: C. A. Lewis and J. H. Mabillard.

Giles Electrical Engineers (Northern) Ltd., 14 Hanover Sq., Leeds, 3. Cap.: £2,000. Dir.: E. H. E. Giles.

Victor Goodwin, Ltd., 89 Vicarage Rd., Langley, Oldbury. Electrical maintenance engineers and contractors, etc. Cap.: £1,000. Dirs.: H. V. Goodwin and R. W. Wales.

Lambert and Quinn, Ltd., Service Rd., Addlestone, Surrey. Machinery and tool makers, mechanical and electrical engineers, etc. Cap.: £500. Dirs.: P. S. R. Lambert and J. A. Quinn.

Le Klint (London) Ltd., 14 Holbein Place, S.W.1. Manufacturers of and dealers in lampshades, electrical and gas fittings, etc. Cap.: £120. Dirs.: P. E. Stemann and Mrs. G. Stemann.

Lewis Powell (Neon Services) Ltd., 4 Crown Point St., Leeds, 10. Electrical and electronic engineers, manufacturers of neon tubing, etc. Cap.: £100. Dirs.: L. H. Powell, G. Powell and E. Smith.

L. G. Maslen, Ltd., 4 London Rd., Bisnop's Stortford. To take over business of retailer of electrical goods and electrical contractor carried on at Bishop's Stortford by Leonard G. Maslen. Cap.: £500. Dirs.: L. G. Maslen and D. V. Castle.

Frank Ross and Partners, Ltd., 1 Gore Rd., New Milton, Hants. Electricians, mechanical engineers, etc. Cap.: £5,000. Dirs.: F. J. Ross, L. E. Luck, C. Snape, A. H. Lacey and A. C. Warneford.

George Smith Electric Ltd., 9 Lancashire Court, New Bond St., W.1. Electricians, mechanical engineers, etc. Cap.: £3,000. Dirs.: G. H. Smith and A. G. Smith.

F. W. Thearle and Son, Ltd., 43 Whitcomb St., Leicester Sq., W.C.2. Manufacturers and distributors of carbons and cinematograph equipment requisites, general and electrical engineers, etc. Cap.: £2,000. Dirs.: F. W. Thearle, J. I. Thearle, and P. W. Alston.

CONTRACTS PLACED

Bethnal Green. Electrical installation in Bonner primary school, Alexander Hawkins and Sons, Ltd., £2,499.

Birmingham. Rewiring of Selly Oak Hospital, Midland Electricity Board, £3,920; same at Dudley Rd. Hospital, F. H. Wheeler and Co., Ltd., £2,654.

Ennerdale R. D. C. Internal wiring of 104 houses at Parton and Egremont, N. Western Electricity Board, £3,139.

Glasgow. Rewiring and changeover from d.c. to a.c. of Treron's premises in Sauchiehall St., B. French, Ltd., £4,976.

Hull. Light and power installations at Estcourt primary school, T. A. Garness, Ltd., £1,280.

Mitcham T.C. Installation of sodium lighting along five roads, Revo Electric Co., Ltd., £4,318.

Norwich. Electrical work at Lakenham girls' secondary school, Mann Egerton and Co., Ltd., £6,657.

Rowley Regis T.C. Installation of electricity in 74 houses on Brickhouse Farm estate, H. Payne, £1,450.

Stockport T.C. Electrical installation at Brimmington estate primary school, Piggott and Whitfield, Ltd., £1,716.

Sunderland T.C. Supply of equipment for flashing pedestrian crossing beacons, Gowshalls, Ltd., £1,008.

Surbiton T.C. Illumination of pedestrian crossing beacons, S.E. Electricity Board, £1,277.

West Hartlepool. Electrical installation in Rossmere primary school, R. V. Hogg and Co.

BUSINESS PROSPECTS

HOME

Aberdeen. Junior secondary, and nursery schools are to be built at Cummings Park; and primary section of nursery school at Mastrick.

Andover. County Planning Committees have approved plans for 79 houses at Smallbones Meadow, 20 dwellings at Forton and 16 at Fyfield.

Berkshire. Construction of secondary school in Sandy Lane, Bracknell. County Architect, Wilton House, Parkside Rd., Reading.

Billingham-on-Tees. Approval has been given for extension of Cassel Works for I.C.I., Ltd.

Bristol. Erection of secondary school at Ashton Park. City Architect is J. Nelson Meredith, Council House, College Green.

Cambridge. Extensions proposed at Impington and Sawston Village Colleges. Estimated cost, £72,000.

Chesterfield T.C. Scheme being considered for development of Kirkstone Rd., Newbold, including erection of shops. Also infants school costing £29,000 is to be built at Brockwell.

Cleator Moor (Cumb.). Remploy, Ltd., London, are planning a factory to replace that already in the town.

Colne Valley U.D.C. Construction of 30 houses at Golcar. Noel Heppenstall, Architect, 135 Armitage Rd., Milnsbridge, Huddersfield.

Crewe. Permit granted for modernisation of Crewe Arms Hotel.

Darton U.D.C. Erection of 28 bungalows on Darton Allendale Rd. site. S. Wilson, Housing Officer, Council Offices.

Derbyshire. Fire stations are to be built at Chesterfield, Alfreton, Eckington, Clay Cross and Bradwell.

Dorking. It is proposed to build Goodwyn's Farm primary school at estimated cost of £31,317.

Dover T.C. It is proposed to build 96 houses and 81 flats on Aycliffe estate.

Dudley. T.C. recommended to approve installation of electric light at Dudley Wood school.

Durham R.D.C. Estimates approved for 40 houses at West Rainton, 52 at Belmont and 48 at Bowburn. Erection of further 50 houses also being planned.

Elstree (Herts) R.D.C. Application to be made for sanction to borrow £79,340 for erection of 64 flats and 6 bungalows on Cowley Hill estate.

Falkirk. Total of 154 houses to be erected in Bog Rd. scheme for Scottish Special Housing Association.

Gosforth U.D.C. Tenders will be invited soon for lighting of High St. Clifford Wyld, surveyor, Council Offices, High St.

Huntingdon. Erection of first instalment of secondary school at St. Ives. S. J. Hands, county architect, County Buildings.

Kingston-on-Thames. Hostel is to be built at Gipsy Hill Training College.

Knaresborough U.D.C. Construction of 83 houses on Manor estate. Council's Architects, F. Tranmere, 3 Victoria Ave., Harrogate.

Leicester. Plans approved for erection of secondary school at New Parks.

Lewes T.C. Erection of 16 flats in two blocks and two shops on Church Lane estate. Borough Engineer and Surveyor, Council Offices, Fisher Street.

Lichfield R.D.C. Planning permission granted to Esso Petroleum Co. for conversion of Little Aston Hall into offices.

Liverpool. Construction of 12 shops, 16 flats and eight houses at Speke. City Architect, Blackburn Chambers, Dale St., Kingsway.

Luton. Ramridge junior school has been included in 1953-54 programme. Estimated cost, £46,028. Also tenders to be invited soon for erection of 74 flats on four sites.

Manchester. British Oxygen Co. Ltd., are to build large factory at Worsley. Work to be completed by July.

Middlesbrough. British Railways to carry out reconstruction work at Middlesbrough station.

Morpeth. N.C.B. is planning to build 60 houses at Longhirst Colliery.

Newcastle-on-Tyne. It is proposed to erect 340 flats and 15 houses on various estates.

Norwich. Plans in hand for erection of 69 dwellings on North Woodlands estate and 58 on Dereham Rd. site.

Portsmouth. Erection of 112 houses in Newbolt Rd. and six flats in Twyford Ave. City Architect, Municipal Offices, 1 Western Parade, Southsea.

Radcliffe T.C. Approval granted for erection of 62 old person's bungalows.

Rugeley U.D.C. Draft agreement with Coal Industry Housing Assoc. to be accepted, providing for erection of 800 houses.

St. Helens T.C. Application to be made for sanction to borrow £156,940 for erection of 96 houses in Herd Lane, and £105,410 for 80 houses on Newton Rd. site.

Seaham U.D.C. One hundred houses to be built on Westlea estate. A. M. Smith, surveyor, Cliff House.

Sheffield. Erection of secondary school at Beaver Hill. W. L. Clunie, dep. city architect, Town Hall.

Shardlow (Derby) R.D.C. Tenders to be invited for erection of 132 houses at Sandiacre, 60 at Stanley, and 24 at Borrowash.

Southall T.C. Scheme proposed for erection of 198 dwellings on Willow Tree estate.

South Shields. Page, Son and Hill, architects, 75 King St., are to prepare plans for new secondary school to be built next year. Also erection of 77 houses on Simonside estate. Borough Engineer, Town Hall.

South Stanley. Cordingley and McIntyre, The College, Durham, are architects for new St. Andrew's Church.

Stretford. Architects for rebuilding St. Hilda's C. of E. school are Thorpe and Whyman, Barclays Bank Chambers, Oldham.

Sunderland. Architects for new R.C. church at Springwell are Reavell and Cahill, Lloyds Bank Chambers, Alnwick.

Urmston U.D.C. It is intended to build 26 shops with 23 maisonettes and 20 flats with 40 maisonettes at Flixton.

Wigan T.C. Erection of 100 dwellings on Worsley Mesnes estate. G. Keighley, Borough Engineer, Municipal Buildings, Library Street.

OVERSEAS

Bahamas. Mr. S. J. Amoury, P.O. Box 15, Nassau, wants to establish connections with U.K. manufacturers of range of radio receivers and domestic electrical appliances.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

AI in design 680,582. Class 9. Electric flat irons and electric apparatus for use in controlling the flow of current to electric-cooking or heating stoves or to electric water boilers. 680,583. Class 11. Electric fires, etc. Allied Ironfounders Ltd., Mortimer House, 37/41 Mortimer St., W.1.

Celsona. 710,414. Class 9. Sound recording apparatus, microphones, electrical and electronic apparatus for selecting and sorting metal. Excel Sound Services Ltd., Norwood Works, off Norwood Ave., Shipley.

Magiflex. 712,445. Class 9. Electric cables and insulated wire. Bertrand Zucker, 138a Cromwell Rd., S.W.7.

Minimac. 710,353. Class 9. Electric switches. Simplex Electric Co. Ltd., Broadwell Rd., Oldbury, Birmingham.

Nulux. 709,769. Class 9. Electric flat irons. T. Price and Son (Stampers), Ltd., Forward Works, Spring Hill Passage, Birmingham 18.

Sonotrack. 710,240. Class 9. Magnetised strips for use as sound recording media. Kodak Ltd., Kodak House, Kingsway, W.C.2.

TeleVidor. 711,920. Class 9. Television apparatus. Vidor Ltd., 681 Salisbury House, Finsbury Circus, E.C.2.

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Brow Plating and Electrical Co., Ltd. Meeting of members will be held at Reginald Russam and Co., Manor Buildings, 2 Manor Row, Bradford, on Feb. 25 at 11.30 a.m. to receive liquidator's report.

Ingham and Owen Ltd. Last day for receiving proofs in respect of intended dividends, Feb. 7. Liquidator is Arthur Tyldesley Eaves, 47 Mosley St., Manchester.

Roevac Air Extractors Ltd. Creditors are asked to send particulars to liquidator, W. A. Walton, 13 Lever St., Piccadilly, Manchester, by Feb. 18. Meeting of members will take place at same address on Feb. 20 at 11.30 a.m.

Supreme Refrigeration Co., Ltd. Meetings of members and creditors will take place at Harry L. Price and Co., 47 Mosley St., Manchester, tomorrow (Friday) at 3 p.m. and 3.15 p.m.

Company Winding-up

W. J. M. Holdings, Ltd., electrical engineers and holding company. At meeting of creditors Official Receiver reported that winding-up order was made on Dec. 17. Company was incorporated as private concern in name of M. C. L. and Repetition, Ltd., in Aug., 1926. Final nominal capital was £500,000, of which £57,000 was issued. A director was said to have acquired control in 1943 and trading was successful. Business and assets were sold in June, 1949, for about £200,000. He contended company was not insolvent. Statement of affairs had not been received but liabilities totalling about £150,000 were referred to. Assets mainly comprised loans to directors and loans to and investments in subsidiary concerns. Resolution passed for appointment of T. J. M. MacLeod, C.A., 4 Bucklersbury, London E.C., as liquidator.

BANKRUPTCY ACTS

Public Examinations

Manchester. Frank Leigh Napier, electrical contractor, trading at 5 School Rd., Sale. Public examination will be at Court House, Quay St., on March 6, at 10.30 a.m. First meeting took place on Tues.

Wandsworth. William E. J. Hardy, electrical engineer and contractor, trading at 187 Putney Bridge Rd., Putney, S.W.15. Public examination on March 13 at the Court House, Garratt Lane, Wandsworth, at 10.30 a.m. First meeting at 3 Central, Buildings, Matthew Parker St., Westminster, tomorrow (Friday) at 10.30 a.m.

Release of Trustee

London. Hyman Gold, trading as Radio and Electric Service at 193 Mare St., Hackney, and as Goldway Electronics at 141 Park Rd., St. John's Wood. Trustee was A. W. Hunter, Cert. Acc., 418-422 Strand, W.C.2.

Intended Dividends

Stoke-on-Trent. Douglas G. Edwards, electrical engineer, trading at 8 Blackfriars Rd., Newcastle-under-Lyme. Last day for receiving proofs, Feb. 4. Trustee is F. C. Ormrod, Official Receiver, 12 Lonsdale St., Stoke.

Dividends

Birmingham. Arthur Fielder, radio and electric retailer, trading as A. Fielder and Co. at 314 Shortheath Rd., Erdington, and 4 Cooksey Lane, Erdington. Second dividends of 2s. 4d. in £ payable tomorrow (Friday) at Official Receiver's Office, Somerset House, 37 Temple St., Birmingham.

Receiving Order

Birmingham. Andrew Craig, electrical and plating plant engineer, of 211 Farm St., Hockely, Birmingham. Date of receiving order, Jan. 20.

TRADE NOTES

Change of Address. The Glasgow office of Serck Tubes, Ltd., have moved to new premises at 78 St. Vincent St., Glasgow C.2. Tel.: Central 5759.

Canadian Distributors. Canadian Aviation Electronics, Ltd., have been appointed distributors for certain Ekco products in Canada. The arrangement concluded gives exclusive rights in that market for radio, television, communications, radar and nucleonic equipment to that concern who will assemble and manufacture Ekco products in Canada. Mr. K. A. Hovington has been appointed C.A.E. sales engineer with direct responsibility for E.K. Cole equipment. Wilkinson Engineering Agencies, of Montreal, remain distributors for Thermovent heaters.

Distributors. Thos. W. Ward, Ltd., have been appointed official general distributors of the "Staffa" mobile crane, and for "Wetherill-Hydraulic" loading shovels.

S.A. Branch. The Aluminium Wire and Cable Co., Ltd., have opened a branch office at Transreef House, 66 Marshall St., Johannesburg, to cover the company's activities in the Union of South Africa, the Rhodesias and Nyasaland. Mr. E. Hall is in charge.

New Office. A Northern office of Hadley Sound Equipments, Ltd., will be opened at Deansgate House, 274 Deansgate, Manchester, on Feb. 2. The manager will be Mr. A. E. Stocker, who has been the company's northern representative.

MEETINGS TO NOTE

THURSDAY, JAN. 29

MERSEYSIDE ELECTRIC LIGHTING SERVICES CTEE.—"Research and the Lamp." Dr. J. N. Aldington. Philharmonic Hall, Liverpool, 7.30 p.m.

I.E.S. (Bradford Group).—"Lighting for Celebrations." A. D. Charters, Y.E.B., 45-53 Sunbridge Rd., 7.30 p.m.

I.E.E. (S. Midland Centre).—Discussion on "Co-ordination of Technical and Practical Training." James Watt Inst., Great Charles St., Birmingham, 6 p.m.

I.E.E. (Swansea sub-centre).—Faraday lecture "Light from Dark Ages: Evolution of Electricity Supply." A. R. Cooper, Brangwyn Hall, Swansea, 6.30 p.m.

E.P.E.A. (S.W. Tech. Group).—"Supervisory Control." L. J. Day. Elect. House, Colston Ave., Bristol, 7.15 p.m.

A.S.E.E. (Luton Branch).—"Types of Meters and Metering." E. H. McCarthy. George Hotel, 8 p.m.

FRIDAY, JAN. 30

I.E.S. (Birmingham Centre).—"Whither Lighting Design?" A. J. P. Pashler and J. R. Anstey. Regent House, St. Philip's Place, Colmore Row, 6 p.m.

I.E.S. (Stoke-on-Trent Group).—Annual dinner.

E.P.E.A. (Southern Tech. Group).—"11 kV and 33 kV Overhead Line Construction." N. G. Simpson. Municipal College, Bournemouth, 7 p.m.

MONDAY, FEB. 2

E.P.E.A. (London Tech. Group)—"Modern H.P. Plant—Starting and Shutting Down." Caxton Hall, Westminster, 7 p.m.

I.E.E. (Mersey and N. Wales and N.W. Centres)—"275 kV Developments on British Grid System." D. P. Sayers, J. S. Forrest and F. J. Lane. Town Hall, Chester, 6.30 p.m.

I.E.E. (N.E. Radio and Measurements Group)—Discussion on "Measurements in Power Supply Systems and in Industry." King's College, Newcastle, 6.15 p.m.

I.E.E. (S. Midland Centre)—"Application of Iron-Cored Coils as Control and Circuit Elements." P. J. Hetzel; "Arc Quenching Circuits," B. H. Stonehouse; and "Machines, Animals and Information," B. de Ferranti. James Watt Inst., Great Charles St., Birmingham, 6 p.m.

I.E.E. (N. Staffs sub-centre).—"Determination of Time and Frequency." Humphrey M. Smith. Crown Hotel, Stone, 7 p.m.

I.E.E. (Irish Branch).—"Laying of Telephone Trunk Cables in Ireland." W. Dain. Trinity College, Dublin, 6 p.m.

I.E.E. (Maidstone).—"Electrical Installations in Large Chemical Factories." D. B. Hogg. Wig and Gown Hotel, 7.30 p.m.

I.E.E. (Reading).—"Colour TV." G. G. Gouriet. Elect. Board Offices, Market Place, 7 p.m.

A.S.E.E. (N.E. London Branch).—"Modern Fluorescent Lighting." D. E. Mutch. Angel Hotel, Ilford, 8 p.m.

TUESDAY, FEB. 3

INCORP. PLANT ENGRS. (London).—"Small Diesel Engines." D. C. Edwards, Royal Soc. of Arts, 7 p.m.

INCORP. PLANT ENGRS. (Edinburgh).—"Preventive Maintenance—British and American Approach." J. C. Robinson. 25 Charlotte Sq., 7 p.m.

I.E.S. (Stoke Group).—"Glass in Service of Light." A. J. Holland. M.E.B., Kingsway, 6 p.m.

I.E.E. (London Supply and Measurements Sections).—"Moving Coil Relay applied to High-Speed Protective Systems." C. Ryder, J. Rushton, and F. M. Pearce. Savoy Place, W.C.2, 5.30 p.m.

I.E.E. (E. Midland Centre).—"Electricity in Newspaper Printing." A. T. Robertson. Elect. Service Centre, Derby, 6.30 p.m.

I.E.E. (E. Midland Centre).—"Electrical Engineering in Steel Tube Industry." University Arms Hotel, Cambridge, 7 p.m.

I.E.E. (N. Midland Centre).—Discussion on "Electric Winders and the Supply Authority." D. R. Love and L. Abram. Elect. Offices, 1 Whitehall Rd., Leeds, 6.30 p.m.

I.E.E. (N.W. Centre).—"Control of a Thermal Neutron Reactor." R. V. Moore. Engineers Club, Albert Sq., Manchester, 6.15 p.m.

A.S.E.E. (S.E. London Branch).—"Electricity Regulations and Electrical Safety." S. J. Emerson. Eltham Congregational Church Hall, Court Rd., Eltham, 8 p.m.

A.S.E.E. (W. London Branch).—"Jointing and Compounds." B. A. Masted. Windsor Castle Hotel, King St., Hammersmith, 7.30 p.m.

A.S.E.E. (Nottingham Branch).—"Recent Developments of Electronic Equipment for Industry." R. J. F. Howard. Elect. Offices, Smithy Row, 7.30 p.m.

WEDNESDAY, FEB. 4

INSTN. OF HEATING AND VENTILATING ENGRS. (London).—"Conservation of Fuel. Heat and Energy." W. L. Boon, E. G. Ritchie and L. Copeland Watts. Mechanical Engrs., Storey's Gate, S.W.1, 6 p.m.

INCORP. PLANT ENGRS. (Southampton).—"Electronics in Industry." Polygon Hotel, 7.30 p.m.

I.E.S. (Edinburgh Centre).—"Luminescence as applied to Lighting." H. G. Jenkins and A. H. McKeag. 357 High St., 7 p.m.

I.E.S. (Newcastle Centre).—"Lighting and Vision as Age Advances." H. C. Weston. Roadway House, 8 Oxford St., 6.15 p.m.

I.E.E. (Tees-side Sub-centre).—Chairman's address by H. Leyburn. Cleveland Scientific Technical Inst., Corporation Rd., Middlesbrough, 6.30 p.m.

I.E.E. (Rugby Sub-centre).—"Electricity in Newspaper Printing." A. T. Robertson. College of Technology and Arts, 6.30 p.m.

I.E.E. (Southern Centre).—"Principles of Colour TV." J. H. Mole and J. W. R. Griffiths. Municipal College Extension, Portsmouth, 6.30 p.m.

A.S.E.E. (N. London Branch).—"National Apprenticeship Scheme." A. R. Secombe. Three Jolly Butchers Hotel, Wood Green, 8.15 p.m.

THURSDAY, FEB. 5

BRITISH INSTN. OF RADIO ENGRS. (Scottish).—"Electronic Computing Machines." B. V. Bowden. The University, Edinburgh.

BRITISH INSTN. OF RADIO ENGRS. (Merseyside).—"Port Radio-Telephone System." D. G. Holloway. Elect. Showroom, Whitechapel, Liverpool, 7 p.m.

INCORP. PLANT ENGRS. (Peterboro').—"Processed Steam." E. S. Chandler. Gas Board, Church St., 7.30 p.m.

I.E.S. (Glasgow Centre).—Annual meeting. "Luminescence as applied to Lighting." H. G. Jenkins and A. H. McKeag. 39 Elmbank Cres., 6.30 p.m.

I.E.S. (Nottingham Centre).—"New Lamps, New Uses, and New Lighting Techniques." H. R. Ruff. Elect. Offices, Smithy Row, 6 p.m.

I.E.S. (Exeter Group).—"Fluorescent Street Lighting—First Five Years." H. E. G. Watts. Providence Hall, Northernhay St., 7 p.m.

I.E.E. (London).—"Electrification of Estrada de Ferro Santos a Jundiai (Sao Paulo Railway)." R. J. B. Chatterton and D. H. Rooney. Savoy Place, W.C.2, 5.30 p.m.

A.S.E.E. (S. London Branch).—"Flame-proof Motors." A. N. D. Kerr. Cafe Royal, Croydon, 8 p.m.

FRIDAY, FEB. 6

I.E.S. (Bath and Bristol Centre).—"Fluorescent Street Lighting—First Five Years." H. E. G. Watts. Elect. Board, Old Bridge, Bath, 7 p.m.

I.E.S. (Huddersfield Group).—"Sodium Lamps and their Applications." A. W. Gostt. Elect. Showroom, Market St., Huddersfield, 7.15 p.m.

I.E.E. (S. Midland Centre).—Annual dinner at Grand Hotel, Birmingham, 6.30 p.m.

MONDAY, FEB. 9

LEICESTER ELECTRICAL SOC.—"Development and Use of Aluminium Sheathed Cables." H. M. Fricke. Elect. Offices, Charles St., 7 p.m.

I.E.S. (Sheffield Centre).—"Specification and Testing of Fluorescent Lamps." W. R. Bloxsidge. University, Western Bank, 6.30 p.m.

I.E.E. (London).—Discussion on "Is Technical Advertising Necessary or Desirable?" W. Bamford. Savoy Place, W.C.2, 5.30 p.m.

EXHIBITION DIARY

Packaging. Closes tomorrow (Fri.)

Amusement Trades. Ninth annual exbn. at Old Royal Horticultural Hall, Westminster, closes today (Thurs.).

Hotel and Catering. Opens at City Hall, Deansgate, Manchester, on Feb. 4, continuing until Feb. 14.

Inventions and New Ideas. Opens on Feb. 18 at Central Hall, Westminster. Closes on Feb. 28.

Daily Mail Ideal Home. Opens on Mar. 3 at Olympia, London, and continues until Mar. 28.

Henley's provide a dependable range of distribution equipment for indoor and outdoor installations.

Examples of equipment for 3,300 to 11,000 volts are illustrated below. Please write for catalogues in which you are interested.

Catalogue 31
Straight Through Joints

Catalogue 32
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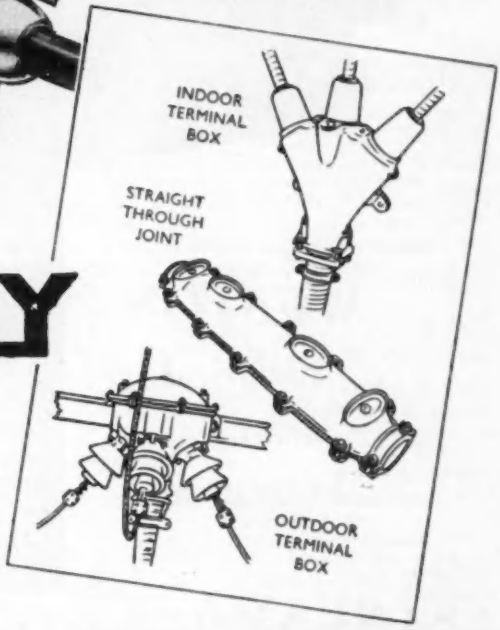
Catalogue 33
Outdoor Terminal Boxes (Inverted)



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No. 8 Miniature Portable Instruments

Although measuring only 4·4" x 4·6" x 1·8", the model S.61 (available in D.C. moving coil, A.C. rectifier and H.F. thermocouple types), has first grade accuracy and in addition to applications where portability is the first consideration, its robustness renders it suitable for many uses in industry, field measurements, educational institutes etc. Scale length is 2·6" and the instrument is magnetically shielded and fitted with spring loaded jewels for shock protection. Full details of the S.61 illustrated above will gladly be supplied on request. The full Weston range includes panel, switchboard, portable, sub-standard and laboratory standard instruments.

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CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WORK WANTED WANTED · FOR SALE

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

132 kV LINE—BRECHIN—BRIDGE OF DUN

TENDERS are invited for the ERECTION of the above line.

Copies of the tender documents may be obtained on application, with a cheque for £2 2s. (returnable), to the Engineers, Messrs. Kennedy and Donkin, Alliance House, 12 Caxton Street, London S.W.1.

The Board do not bind themselves to accept the lowest or any tender.

W. D. D. FENTON,
Secretary.

16 Rothesay Terrace, Edinburgh 3. (C 467)

CITY OF NORWICH

NORTH PARK AVENUE HOUSING ESTATE
PROVISION OF STREET LIGHTING

TENDERS are invited for the provision of street lighting on roads on the above-mentioned housing estate.

The work consists of supplying, erecting and putting into service of 106 No. reinforced concrete lighting columns together with lanterns and ancillary works. 55 No. of the laterns will be for use with 100 W tungsten lamps and 51 No. for use with 45 W sodium lamps.

The general conditions of contract recommended by the Institution of Electrical Engineers and the drawings may be seen, and copies of the specification, bills of quantities and tender forms may be obtained, at the City Engineer's Office, City Hall, Norwich, on payment of a deposit of £2 2s. which sum will be returned on receipt of a bona fide tender and the return of all the documents.

Tenders endorsed "Tender for Street Lighting, North Park Avenue Housing Estate" and sealed in envelopes to be provided, shall be delivered to the undersigned not later than 10 a.m. on Wednesday, Febcuary 18, 1953.

The Corporation do not bind themselves to accept the lowest or any tender.

H. C. ROWLEY, M.I.C.E.,
City Engineer.

City Hall, Norwich
January 20, 1953. (C 478)

APPOINTMENTS VACANT

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

MIDLANDS ELECTRICITY BOARD

ENGINEERING DRAUGHTSMAN required at the Shropshire and Herefordshire Sub-Area Headquarters. Applicants should be proficient in the preparation of engineering drawings required for the construction and operation of transmission and distribution networks. Salary £433 to £567 per annum (N.J.B. Schedule D, Grade 6).—Apply in writing within 14 days, stating age, experience, salary and position, to W. Winwood, Sub-Area Manager, Midlands Electricity Board, Spring Gardens, Ditherington, Shrewsbury.

A. STEPHENS,
Secretary.
(C 509)

HER MAJESTY'S COLONIAL SERVICE

COLONIAL ENGINEERING SERVICE

THE COLONIAL OFFICE announces that a limited number of vacancies exists in the Colonial Engineering Service for PUPILS and PROBATIONERS in Civil Engineering and for PUPILS in Mechanical and Electrical Engineering (including Telecommunications).

The vacancies exist mainly in West, East and Central Africa, Malaya, and the Far East.

Candidates for appointment should hold a pass in, or, by virtue of a university degree or other qualification, exemption from Sections A and B of the examinations for Associate Membership of the Institution of Civil Engineers, or the Institution of Mechanical Engineers, or the Institution of Electrical Engineers. Engineering students whose degree examinations take place later this year may apply and will, if selected, be offered appointment subject to passing their final examinations.

Applications should reach the Director of Recruitment (Colonial Service), Colonial Office, Sanctuary Buildings, Great Smith Street, S.W.1, in writing, by March 31, 1953, and should give brief details of the candidate's age, qualifications and experience, quoting the reference CDE 100/011. Further details will be supplied on request. (C 483)

BRITISH ELECTRICITY AUTHORITY

South Western Division

ASSISTANT MAINTENANCE ENGINEER (Mechanical) required at Portishead "A" Generating Station.

Superannuation scheme. Salary, N.J.B. Class "J" Grade 9, £719-£750.

Applicants must have had a thorough practical mechanical engineering training and have had considerable experience in the maintenance of turbines, boilers and auxiliary plant. Corporate membership of the Institution of Mechanical Engineers or equivalent qualification would be considered an advantage.

Application forms obtainable from the Divisional Secretary, 26 Oakfield Road, Bristol 8, to be returned by February 9, 1953. (C 482)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, an ASSISTANT ENGINEER (Substations) in District 462 (Newport) in the Eastern Sub-Area of the Board.

Candidates should have experience of Construction and Maintenance work in all types of a.c. substations up to 33 kV and should preferably also have experience in the operation and maintenance of rotary conversion plant.

Salary in accordance with Class "F," Grade 6 (£738/£755-£771) of the N.J.B. Schedule.

Applications stating age, present position and salary, qualifications and experience, and giving three referees to be addressed to the Secretary, to arrive by February 7, 1953.

D. G. DODDS,
Secretary.

St. Mellons,
Cardiff. (C 494)

SCUNTHORPE HOSPITAL MANAGEMENT COMMITTEE

PHYSICS DEPARTMENT TECHNICIAN

IMMEDIATE vacancy for Technician in Physics Department of Radiotherapy Centre to assist in instrument making, laboratory work and X-ray plant maintenance. Applicants with knowledge of building and servicing electronic equipment preferred. Electrical engineering qualifications and experience in other aspects of the work advantageous. Some radiation work will have to be undertaken. Whitley Council terms, present salary scale £410 by £15 (3) and £20 (1) to £475. N.H.S. Superannuation Scheme.—Apply, naming two referees, to Secretary, War Memorial Hospital, Scunthorpe, Lincs. (C 510)

BRITISH ELECTRICITY AUTHORITY

London Division

APPLICATIONS are invited for the following superannuable posts. Salary, including London Allowance, and conditions of service in accordance with N.J.B. Agreement, Schedule "A" or "C."

TURBINE HOUSE SUPERINTENDENT
Deptford West Generating Station.

Qualifications: Sound engineering training, with technical qualifications up to at least Higher National Certificate standard, followed by experience in operating a large power station. Experience in repair and maintenance of turbine room plant and e.h.t. switchgear would be an advantage. Salary: Class "J," Grade 6, £927 3s. p.a.

MAINTENANCE ENGINEER (MECHANICAL)
Battersea Generating Station.

Qualifications to at least Ordinary National Certificate standard with sound engineering training, preferably with an apprenticeship with a heavy engineering firm. Extensive experience with the maintenance of large high pressure turbine plant and ancillary equipment is essential. Salary: Class "L," Grade 7, £972 6s. p.a.

SHIFT CHARGE ENGINEER
Deptford East Generating Station.

Candidates should have received a sound engineering and technical training and have reached a recognised standard. Practical experience in the operation of power station plant is essential. Salary, Class "H," Grade 7, £810 12s. p.a.

FIRST ASSISTANT STATION CHEMIST
Barking "A" and "B" Generating Stations.

Candidates should preferably be qualified chemists; consideration given to applicants with the Higher National Certificate experienced in the analysis of fuels, oils and waters; plant operational experience should have been gained either in a chemical works or in power station. This appointment requires personality, organising and technical ability. Salary, Class "M," Grade 9, £906 3s. p.a.

GENERAL ASSISTANT ENGINEER
Technical Department, Divisional H.Q.

Candidates should have a degree or other qualification exempting them from the A.M.I.E.E. examination. They should have had experience in the manufacture and testing of electrical equipment used in generating stations and high voltage transmission systems. Experience in the commissioning and maintenance of such equipment including protective gear will be an added qualification. Salary, Class "AX," Grade 8, within scale £526 1s. to £670 19s., ultimately rising to Class "EX," £749 14s. p.a.

GENERAL ASSISTANT ENGINEER
(Efficiency and Testing), Divisional H.Q.

Candidates should have a good technical education to Higher National Certificate standard. Duties would include laboratory calibration work, and experience in the use of electrical temperature measuring equipment is required. Salary, Class "AX," Grade 8, within scale £526 1s. to £670 19s., ultimately rising to Class "EX," £749 14s. p.a.

CHEMICAL ASSISTANTS
Barking "C" and Bankside Generation Stations

These posts will appeal to those who have some industrial laboratory experience or who wish to embark on a scientific career. Salary in the range £180 to £470 dependent on age and qualifications. Certificate of general education at ordinary level required. Good canteen and welfare facilities exist. Every encouragement given to gain promotion.

Applications must be made on the form obtainable from the Divisional Secretary, B.E.A. London Division, Generation House, Great Portland Street, W.1, and be received within 14 days of this advertisement. (C 496)

ELECTRICAL POWER ENGINEERS' ASSOCIATION

NOTES TO MEMBERS

MEMBERS are urged NOT TO APPLY for positions advertised by the South Eastern Division of the British Electricity Authority at Littlebrook Power Station, other than the position of Station Chemist and the positions of Assistant Engineer (Handling) and Assistant Engineer (Handling-Shift).

Any Member applying for or accepting a position at Littlebrook Power Station, other than those named herein, will jeopardize the position of fellow Members already employed there. (C 457)

BRITISH ELECTRICITY AUTHORITY

North Western Division

VACANCY No. 12/53—DEPUTY POWER STATION SUPERINTENDENT at Bury Generating Station. Salary £858 to £894 (N.J.B. E.3). Engineering qualifications and experience in administration, operation and maintenance of a steam generating station is essential.

Apply to Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, before February 7. Quote vacancy No. (C 484)

YORKSHIRE ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

No. 4 (Leeds) Sub-Area

(Leeds District)
CONSUMERS' ENGINEER
(COMMERCIAL DEPARTMENT)

Applicants should be Corporate Members of the Institution of Electrical Engineers or hold qualifications leading to such membership, and must have had a sound training and subsequent experience in the work of a Consumers' Engineer, and be capable of giving advice to all classes of consumers regarding utilisation.

Details should be given of experience in the following matters:—

Negotiations with consumers requiring electricity supplies, application of I.E.E. Wiring Regulations and other relevant regulations in testing and inspecting consumers' installations, tariffs, sales development, control of staff and workpeople.

Salary: N.J.B. Class "J" Grade 8, £764-£796 per annum.

Applications, giving full details of age, qualifications, and experience, should be forwarded to the Manager, No. 4 (Leeds) Sub-Area, Yorkshire Electricity Board, Bramhope, Leeds, not later than February 12, 1953.

No. 5 (Wakefield) Sub-Area

(Castleford District)
GENERAL ASSISTANT DISTRICT ENGINEER

Applicants should have had experience in a large undertaking employing e.h.v. and l.v. underground mains. Experience in fault location, the supervision of jointing, cable laying and the erection of overhead lines would be of advantage.

Salary, N.J.B. Class "E" Grade 11, £724-£540 per annum.

Applications, giving full details of age, qualifications and experience, should be forwarded to the Manager, No. 5 (Wakefield) Sub-Area, Yorkshire Electricity Board, 1a Denby Dale Road, Wakefield, not later than February 12, 1953. (C 481)

EASTERN ELECTRICITY BOARD

Essex Sub-Area

GENERAL ASSISTANT ENGINEER 9/53.R
Chelmsford District

CANDIDATES should have had a sound training in electrical engineering and experience in the construction, operation and maintenance of h.v. and l.v. underground and overhead distribution systems.

The salary for the appointment will be in accordance with Class "E," Grade 11 of the National Joint Board Salary Agreement, commencing at £524 p.a. Both future salary and conditions of service will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidate will be required to contribute to a superannuation scheme, and may be required to undergo a medical examination.

Applications by letter, stating age, education, qualifications and experience, with details of present appointment and salary, should be submitted to the District Manager, Chelmsford, Eastern Electricity Board, Anchor Street, Chelmsford, Essex, within 14 days of the appearance of this advertisement. (C 498)

NORTHAMPTON POLYTECHNIC, London E.C.1

APPLICATIONS are invited for additional full-time ASSISTANT LECTURER in the Electrical Engineering Department. Candidates should possess University Degree in Engineering or equivalent qualification and have had practical experience in the Electrical Industry.

Salary in accordance with the London Technical Burnham Scale Grade "B," viz., £490 by £25 to £765 with allowance of £60 for graduates or equivalent and up to £54 for training, plus London allowance of £36 (£48 if over 37).

Particulars and form of application from Secretary.

J. F. RICHARDSON, Ph.D., B.Eng., M.I.E.E.,
Principal.

(C 495)

BRITISH ELECTRICITY AUTHORITY

South Eastern Division

SHIFT CHARGE ENGINEER, Croydon "A" Power Station. Applicants should have had suitable technical training and experience in the operation of high-pressure turbine and boiler plant and E.H.T. switchgear, N.J.B. Conditions of Service and salary, Class "F," Grade 7, £731 17s. per annum including London Allowance. Applications on forms obtainable from Station Superintendent, Croydon "B" Power Station, Beddington Farm Lane, Purley Way, Croydon, Surrey, to be received by him not later than February 7, 1953. (C 480)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the following posts in this Division:—

TESTING AND EFFICIENCY SECTION
(Generation Operation), Divisional Headquarters
SECOND ASSISTANT ENGINEER
Vacancy No. 3/53

Applicants should have a good general and technical education, workshop experience, and a thorough knowledge and experience of the operation, testing and efficiency control of modern steam generating plant.

Preference will be given to candidates possessing a university degree, or equivalent, specialised knowledge on boiler combustion and cooling tower problems, and Corporate Membership of the Institution of Electrical Engineers or the Institution of Mechanical Engineers.

Salary for the above appointment will be within Schedule "C," Class "AX/DX," Grade 2 (£834 to £1,053 p.a.) of the National Joint Board Agreement.

THIRD ASSISTANT ENGINEER
Vacancy No. 4/53

Applicants should have a good general and technical education to Higher National Certificate standard, workshop experience, and a thorough knowledge and experience of operation and testing of modern steam generating plant, including instrumentation.

Preference will be given to candidates possessing an engineering degree, membership of the Institution of Electrical Engineers or the Institution of Mechanical Engineers, and specialised knowledge of boilers and associated plant.

Salary will be within Schedule "C," Class "AX/DX," Grade 5 (£649 to £858 p.a.) of the National Joint Board Agreement.

GENERAL ASSISTANT ENGINEER
Vacancy No. 5/53

Applicants should have a good general and technical education to Higher National Certificate standard, workshop experience, and a good knowledge and experience of the operation and testing of modern steam generating plant, including instrumentation and automatic control systems, production of reports and records.

Salary will be within Schedule "C," Class "AX/DX," Grade 6 (£501 to £894 p.a.) of the National Joint Board Agreement.

TECHNICAL DEPARTMENT
Divisional Headquarters
GENERAL ASSISTANT ENGINEER (PROTECTION)
Vacancy No. 6/53

The minimum technical qualification required is the Higher National Certificate in Electrical Engineering. Preference will be given to candidates who have completed a recognised post-graduate apprenticeship, and experience of high voltage switchgear and protective gear will be an advantage.

The successful candidate will be employed as assistant to the Regional Engineer (Southern Group) and will be required to reside at or near Leicester or Coventry.

The salary will be within Schedule "C," Class "AX/DX," Grade 8 (£501 to £894 p.a.) of the National Joint Board Agreement. The commencing salary will depend upon qualifications and experience.

ASSISTANT SHIFT CHARGE ENGINEER
Spondon
Vacancy No. 7/53

Applicants should possess the Higher National Certificate, or its equivalent, and have had experience in a responsible position in a modern generating station.

The salary will be in accordance with Class "H," Grade 9 (£680 to £706 p.a.) of the National Joint Board Agreement.

GENERATION CONSTRUCTION DRAWING OFFICE
North Wilford Power Station, Nottingham
(a) SECTION LEADER (ELECTRICAL)
Vacancy No. 8/53
(b) SENIOR DRAUGHTSMEN (ELECTRICAL)
Vacancy No. 9/53

Candidates for (a) should be capable of taking charge of a Section consisting of senior and junior draughtsmen engaged upon the preparation of electrical projects for new power stations and extensions to existing power stations.

Candidates for (b) should have experience in the preparation of layouts and diagrams for the installation of e.h.t. and l.t. switchgear, transformers, e.h.t. and l.t. cables; knowledge of protective gear systems would be an advantage.

Preference will be given to candidates (for both the above positions) with technical qualifications equivalent to Higher National Certificate standard.

The salary for the above appointments are: (a) Grade 3, Schedule "D" (£780 to £884 p.a.) and (b) Grade 4, Schedule "D" (£671 to £780) of the National Joint Board Agreement.

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(*Continued from previous column*)

CONSTRUCTION DEPARTMENT
Divisional Headquarters
THREE SENIOR ASSISTANT ENGINEERS TO GROUP CONSTRUCTION ENGINEERS
Vacancy No. 10/53

Preference will be given to candidates holding a degree in mechanical and electrical engineering, with experience in power station construction and operation.

Salary will be in accordance with Grade 1, Class "AX/DX," (£970 to £1,198 p.a.) of the National Joint Board Agreement.

Closing date for the above appointments is February 9, 1953.

ASSISTANT CHEMIST
Coventry Power Station
Vacancy No. 12/53

Applicants should have had practical experience in all branches of power station chemistry. Preference will be given to candidates possessing the Higher National Certificate in Chemistry or equivalent qualifications.

Salary for the above appointment will be within Class "G," Grade 9 (£641 to £867 p.a.) of the N.J.B. Agreement.

Closing date for this appointment: February 20, 1953.

GENERATION CONSTRUCTION DEPARTMENT
Divisional H.Q.
THIRD ASSISTANT ENGINEER (MECHANICAL)
Vacancy No. 14/53

Applicants should have had a fundamental training in mechanical engineering, including workshops, and should preferably have had experience in the manufacture, erection, maintenance and operation of mechanical plant as installed in modern power stations. Candidates should possess a university degree or equivalent qualification in mechanical engineering.

Salary for the above appointment will be within Class "AX/DX," Grade 5 (£849 to £858 p.a.) of Schedule "C" of the N.J.B. Agreement.

Closing date for this appointment: February 13, 1953.

The above posts will be pensionable within the provisions of the British Electricity Authority and Area Boards Superannuation Scheme.

Applications should be submitted on the official form which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and should be returned not later than the dates stated. Please quote Vacancy Number.

L. F. JEFFREY
Divisional Controller.
(C 497)

SOUTHERN ELECTRICITY BOARD

GENERAL ASSISTANT ENGINEER (CONSTRUCTION)

NO. 2 (NEWBURY) Sub-Area Office. Salary, N.J.B., Class "E," Grade 13, Column 1 (£583 per annum). N.J.B. conditions of service.

The duties of the post will be to assist the Senior Assistant Engineer in connection with the supervision and co-ordination of construction work throughout the Sub-Area, to prepare records and analyses of results.

Qualifications of the post are a suitable technical training and sound experience of construction work throughout its range of urban and rural practice relating to mains and substations.

Applications on forms obtainable from the Sub-Area Secretary and returned to him at 7 Oxford Road, Newbury, in envelopes suitably endorsed, not later than February 9, 1953.

INSTALLATION ASSISTANT

Newbury District of No. 2 (Newbury) Sub-Area. Salary N.J.B., Class "E," Grade 11 (£524 to £540 per annum). N.J.B. conditions of service.

Applicants should have sound experience in preparation of specifications and estimates for all types of electrical wiring installations, particularly industrial work. Candidates should be competent to supervise electricians or organise allocation of work and generally assist the Installation Engineer.

Applications on forms obtainable from the Sub-Area Secretary and returned to him at 7 Oxford Road, Newbury, in envelopes suitably endorsed, not later than February 9, 1953.

DISTRICT MAINS DRAUGHTSMAN

Ealing District of No. 1 (Southall) Sub-Area. Salary, N.J.C., Grade 2 (£460 to £520 per annum plus London Weighting). N.J.C. conditions of service.

Applicants should have had suitable drawing office experience, including the preparation of site plans, h.v. and l.v. diagrams, map work, etc.

Applications on forms obtainable from the Sub-Area Secretary and returned to him at 2-6 Windmill Lane, Southall, in envelopes suitably endorsed, not later than February 9, 1953.

The successful candidates for the above appointments will be required to contribute to the B.E.A. and Area Boards' Superannuation Scheme, if eligible. (C 499)

CROWN AGENTS FOR THE COLONIES

FOREMAN ELECTRICIAN required by the Nigerian Government Railway for one tour of 18 to 24 months with option of appointment either (a) on agreement with prospect of permanent and pensionable employment with salary in the scale £750 rising to £1,035 a year including expatriation pay; or (b) on agreement in a temporary capacity with salary in the scale £807 rising to £1,115 a year including expatriation pay and with a gratuity at the rate of £25 or £37 10s. (according to salary) for each three months' service. Commencing salary according to age and experience. Outfit allowance £60. Free passages for officer and wife and assistance towards cost of children's passages. Liberal leave on full salary. Candidates between 28 and 35 years of age, must have served an apprenticeship as an electrician and have had at least seven years' subsequent experience in electrical maintenance including repairs to electric motors driving works machine tool equipment, overhead cranes and their control gear, also wiring systems where d.c. and a.c. is the power supply. A thorough knowledge of armature winding is essential.

Apply at once, by letter, stating age, full names in block letters and full particulars of qualifications and experience and mentioning this paper, to the Crown Agents for the Colonies, 4 Millbank, London S.W.1, quoting on letter M.2961I.B. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. (C 469)

BRITISH ELECTRICITY AUTHORITY

Yorkshire Division

APPLICATIONS are invited for the following appointments:—

SECOND ASSISTANT STATION CHEMIST
Skelton Grange Power Station, Leeds
Salary £607 to £628 per annum, N.J.B. Agreement.

Applicants should hold the Higher National Certificate in Chemistry and have had previous experience of analysis and testing of fuels, waters and oils.

JUNIOR ASSISTANT CHEMIST
Keadby Power Station, near Scunthorpe
Salary £390 to £491 per annum, N.J.B. Agreement.

Applicants should hold the National Certificate in Chemistry and have had some previous laboratory experience.

Forms of application obtainable from the Divisional Secretary (Establishments), British Electricity Authority, British Electricity House, St. Mary's Road, Leeds 7, to be returned within 14 days of the appearance of this advertisement.

G. A. VOWLES,
Divisional Controller.
(C 479)

GOVERNMENT OF KUWAIT

A MECHANICAL ENGINEER required for service with the Government of Kuwait, Persian Gulf. Applicant must have extensive experience in organising general mechanical and electrical repair workshops. He will have to take charge of the machine, fitting and repair shops for all classes of mechanical and electrical machinery. He will also be expected to organise preventive maintenance programmes for large installations which will be installed in central kitchens, hotels, hospitals, etc., which have large air-conditioning, electrical and cooking equipments. Applicant should be a Corporate Member of the Institution of Mechanical Engineers.

The consolidated starting salary will be up to £2,400 per annum, according to experience. Free furnished quarters and free medical attention are provided. The first year will be probationary and home leave will be granted at the end of three years' service. Married accommodation cannot be promised during the first year of service.

Applications, stating age and giving full details of experience and qualifications, should be addressed to the Secretary, Ewbank and Partners Ltd., Engineering Consultants, 10-11 Grosvenor Place, London S.W.1. (C 468)

ASSISTANT POWER STATION SUPERINTENDENT required by large British company for Middle East. He must be under 40 and be capable of operating oil- or gas-fired steam power station of three 18,750 kW turbo-alternators with six 120,000 lb/hr 400 p.s.i. boilers and 11 kV switchgear. Should hold chartered qualification and have had 10 years' steam power station experience. Substantial allowances in addition to salary; pensionable post; biennial paid home leave. Married man would have to face initial separation—Write, quoting No. 307, to Box No. 6508, c/o Charles Barker and Sons, Ltd., 31 Budge Row, London E.C.4. (C 490)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

JOHNSON & PHILLIPS LTD.

OVERSEAS APPOINTMENT FOR SWITCHGEAR ENGINEER

REQUIRED to develop switchgear manufacture in an existing factory in India. Applicants must be fully conversant with the manufacture and assembly of switchgear up to 11,000 V. and be competent to plan complete switchgear installations. The immediate problem is the design and construction of switchboards using imported circuit breakers and components.

The appointment is a senior one offering scope for initiative and opening for advancement. Salary will be at a generous level. Suitable provisions for retirement are available. Normal home and local leave arrangements.

Applicants should preferably be 28 to 40 years of age.

Applications, which will be treated in strict confidence, should be addressed to:—

The Managing Director,
JOHNSON & PHILLIPS LTD.
Victoria Way, Charlton, London, S.E.7
(C 435p)

A CABLE COMPANY requires an experienced BUYER with some knowledge of non-ferrous metal markets and the purchasing of engineering stores. A public school or equivalent education desirable. The appointment is pensionable and will carry a good salary. Replies will be treated in the strictest confidence and interviews arranged for the convenience of applicants, who should state detailed experience in chronological order, salaries earned and required.—Replies to Box No. 2343, Electrical Times. (C 461)

BRITISH ELECTRICITY AUTHORITY (South Eastern Division) require a CHIEF GENERATION ENGINEER (OPERATION) at Divisional Headquarters, Kingston-upon-Thames. The commencing salary will be according to qualifications and experience but will be not less than £1,850 p.a., which is provisional pending the negotiation of the permanent salary scale.

Applications, stating age, qualifications, present appointment and salary, to D. Moffat, Director of Establishments, British Electricity House, Winsley Street, London, W.1, by February 16, 1953. Candidates are asked to submit concise details giving evidence of experience of modern generating plant (mechanical and electrical), organisation and administration, leadership and knowledge of Labour Relations machinery. Quote reference AE/318. (C 486)

BRITISH ELECTRICITY AUTHORITY (South Wales Division) require a CHIEF GENERATION ENGINEER (CONSTRUCTION) at Divisional Headquarters, Cardiff. The commencing salary will be according to qualifications and experience but will be not less than £1,850 p.a., which is provisional pending the negotiation of the permanent salary scale.

Applications, stating age, qualifications, experience, present appointment and salary, to D. Moffat, Director of Establishments, British Electricity House, Winsley Street, London, W.1, by February 16, 1953. Quote reference AE/317. (C 485)

ELECTRICAL ENGINEER required with good knowledge of physics to double on general mathematical work of a mechanical or thermodynamical nature.—Send details of qualifications, experience and salary required to the Personnel Officer, Sir George Godfrey and Partners, Ltd., Hampton Road West, Hanworth, Middlesex. (C 487)

ELECTRICIAN. Fully qualified electrician with engineering knowledge required for maintenance staff. Permanent position.—Apply to East Kent Packers, Ltd., Whitstable Road, Faversham, Kent. (C 500)

ESTIMATING ENGINEER for preparation of electrical installation estimates, all types of power and lighting. Must have practical installation experience. Preference will be given to man conversant in the building up of interim and final accounts.—Reply, with copies of references, giving particulars of training, age and salary expected, to Wm. Townson and Sons Ltd., Higher Swan Lane, Bolton. (C 471)

ESTIMATOR required with experience in preparing tenders for all classes of industrial a.c. and d.c. electrical rotating machinery, switchgear, etc., and familiar with B.S. Specifications. Five-day week. Pension scheme.—Replies, stating age, qualifications and salary expected, to Personnel Manager, Lancashire Dynamo and Crypto, Ltd., Trafford Park, Manchester 17. (C 492)

FOREMAN for repair shop. Must be familiar with rewinds up to 500 h.p., static and rotary, and capable of handling mixed labour.—Apply, giving full details, to Simpson Bros. (of Hapton) Ltd., Hapton. (C 436)

DE HAVILLAND

Advanced Guided Weapon · Projects

Technicians are needed for key positions in an expanding team engaged on research, design and development work. Permanent and progressive posts, both senior and junior, are available for men of ability and enthusiasm who can offer sound knowledge and experience. This is a unique opportunity of acquiring advanced techniques and promotion prospects are good.

Reference:

17 DESIGNERS experienced in servo mechanisms, gyros, hydraulics, pneumatics, materials and structures related to aircraft or armament work.

17A DRAUGHTSMEN—SENIOR, INTERMEDIATE and JUNIOR for varied aspects of design.

18 MATHEMATICIAN for work on control systems. Knowledge statistics and noise. First-class honours or higher degree.

19 PHYSICISTS—SENIOR—for research team. With honours degree and industrial experience.

20 PHYSICISTS as research workers for field and laboratory tests, with good degree and some industrial experience in electronics or specialising in mathematics.

21 ELECTRONIC ENGINEERS — SENIOR — to be responsible for section engaged in work as reference 22 below.

22 ELECTRONIC ENGINEERS experienced in one or more of following—circuit development, miniature and sub-miniature techniques, magnetic amplifiers and equipment.

23 DEVELOPMENT ENGINEERS, H.N.C. standard, experienced structural testing (preferably aircraft), knowledge of strain-gauge equipment an advantage. Capable of working on own initiative planning test equipment and analysing test results.

24 DEVELOPMENT ENGINEERS, H.N.C. standard, familiar small electro-mechanical equipment, pneumatic and hydraulic servo systems for testing and developing. Knowledge electronic test equipment a distinct advantage. Should have experience in undertaking planning, carrying out and analysing of complete tasks.

26 INSTRUMENT ENGINEERS—experience of electro-mechanical instruments (gyros, small specialised motors, relays, etc.).

27 SERVO ENGINEERS—practical experience of servo mechanisms.

28 LABORATORY ASSISTANTS, qualified H.N.C. City and Guilds standard, for varied work.

29 WIREMEN—advanced laboratory standard.

30 WIREMEN—familiar circuit diagrams, radio or radar maintenance experience. Young ex-Servicemen particularly invited to apply.

31 TRIALS ASSISTANT—experience as reference 30 above.

Apply in confidence quoting reference number of post in which interested to:

The Personnel Manager,

DE HAVILLAND PROPELLERS LTD.

Hatfield · Hertfordshire.

DORMAN LONG & Co. Ltd.

in view of their major plant developments, require the services of electrical staff. Experience of rolling mills, coke ovens and blast furnace plant, etc. an advantage but not essential.

(a) **SENIOR ASSISTANT ELECTRICAL ENGINEERS,** preferably having design, layout and installation experience on heavy electrical plant. Corporate membership of I.E.E. desirable.

(b) **JUNIOR ASSISTANT ELECTRICAL ENGINEERS,** Higher National Certificate qualifications desirable.

(c) **METERING AND PROTECTION ELECTRICAL ENGINEER.** Corporate membership of I.E.E. desirable.

(d) **ELECTRICAL DRAUGHTSMEN,** experienced on distribution, control and lighting schemes.

Applications, stating full particulars of experience, qualifications, age, etc. and salary required, to be forwarded to

THE CHIEF ELECTRICAL ENGINEER, DORMAN LONG & COMPANY LIMITED, G.P.O. BOX 11, ROYAL EXCHANGE, MIDDLESBROUGH, Marked "PERSONAL". (C 424p)

IMPERIAL CHEMICAL INDUSTRIES LTD., General Chemicals Division, invite applications for the following vacancies:—

SENIOR ASSISTANT ENGINEER (GENERATION), P/1

Applications are invited for the position of additional senior assistant engineer in the Generation Section of the company's Power Department, Runcorn, Cheshire. The duties are to assist, under the direction of the Generation Section manager in the headquarters of the department with the operation and maintenance of the division's power stations, which have an installed capacity of more than 100,000 kW and with the design of extensions thereto. Applicants, who should be between the ages of 30 and 38 years, and should hold a degree in mechanical or electrical engineering, must have had a sound mechanical engineering training and should have had considerable experience of the operation and maintenance of large modern high-pressure steam power stations. In addition they should have had some experience of the preparation of designs and specifications for new plant and of investigations and tests in connection therewith, while Corporate Membership of either the Institution of Mechanical Engineers or the Institution of Electrical Engineers is also desirable. Commencing salary, up to £1,250. The selected candidate will be required to pass a medical examination and to join the company's pension fund.

SENIOR ASSISTANT ENGINEER (MECHANICAL), P/2

Applications are invited for the position of additional senior assistant engineer in the Mechanical Section of the company's Power Department, Runcorn, Cheshire. The duties are to assist, under the direction of the Mechanical Section manager in the headquarters of the department, with the maintenance of the mechanical equipment of the division's power stations, which have an installed capacity of more than 100,000 kW, and with the design of extensions thereto. Applicants, who should be between the ages of 30 and 38 years, and should hold a degree in mechanical engineering, must have had a sound mechanical engineering training and should have had considerable experience of the maintenance and design of the mechanical equipment of large modern steam power stations. In addition, they should have had some experience of the preparation of designs and specifications for new plant and investigations and tests in connection therewith, while Corporate Membership of the Institution of Mechanical Engineers is also desirable. Commencing salary up to £1,150. The selected candidate will be required to pass a medical examination and to join the company's pension fund.

Applications in writing, giving age and full particulars of education, technical qualifications, engineering training and power station experience, should be sent to the Staff Manager, Imperial Chemical Industries Ltd., General Chemicals Division, Cunard Building, Liverpool 3, quoting reference P/1 or P/2 as appropriate. (C 437)

ELECTRICAL DRAUGHTSMAN required for large paper mill by Bowater's Thames Paper Mills, Ltd., at Northfleet, Gravesend, Kent. Must be experienced in layout of power installations, wiring diagrams and switchgear. Some mechanical experience an advantage.—Please state age, experience, qualifications and salary required. (C 512)

JOHNSON AND PHILLIPS LTD. require a CHIEF SWITCHGEAR DRAUGHTSMAN for SOUTH AFRICA. Candidates must have good practical and technical training in addition to experience with leading manufacturers, both in drawing and design offices, and preferably be between 30 and 40 years of age.—Applications in writing, giving full particulars of training, experience, age and salary required, to Employment and Welfare Manager, Johnson and Phillips Ltd., Victoria Works, Charlton, S.E.7. (C 463)

PAKISTAN. Applications, preferably from single men aged 28-40 years, are invited by an old established cable company, for a position of MANAGER AND ENGINEER of their local selling company in Karachi. Duties will include periodic visits to the company's agents in India to give collaborative assistance. Applicants should be suitably qualified by technical training and have electrical engineering experience, which must include transmission and distribution. Initiative for sales development and some commercial knowledge required. —Details of qualifications, experience and salary expected to Box No. 2329, Electrical Times. (C 407)

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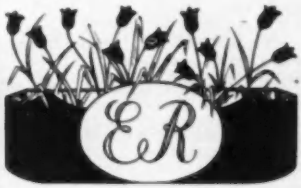

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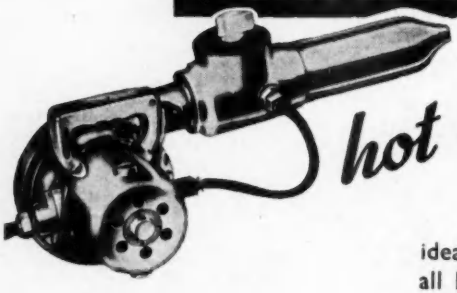

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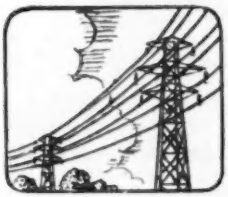

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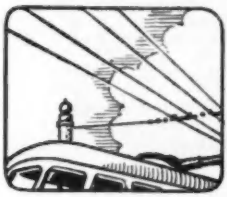

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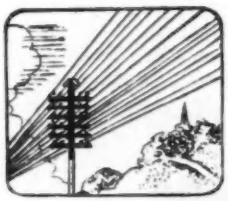

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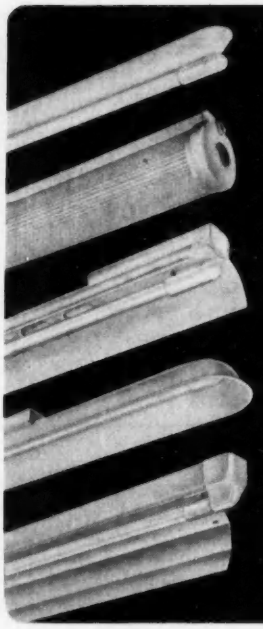

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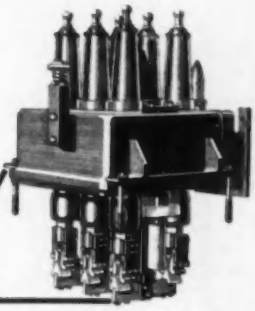

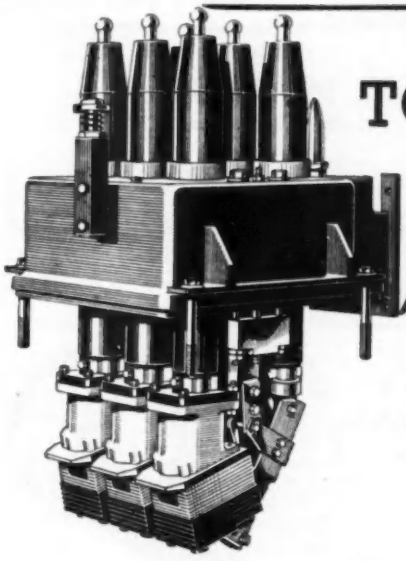

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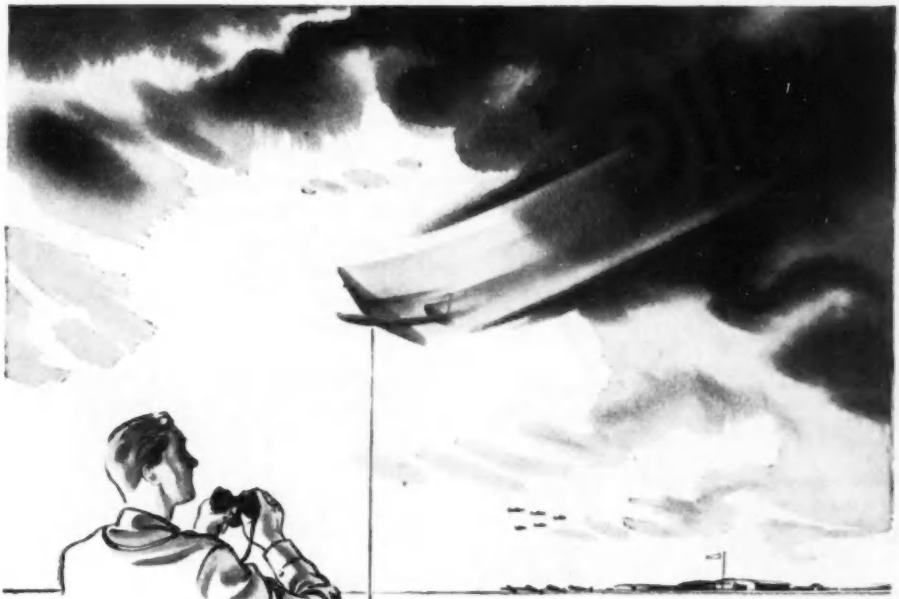

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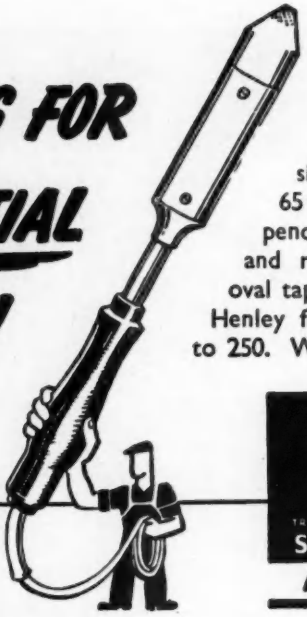

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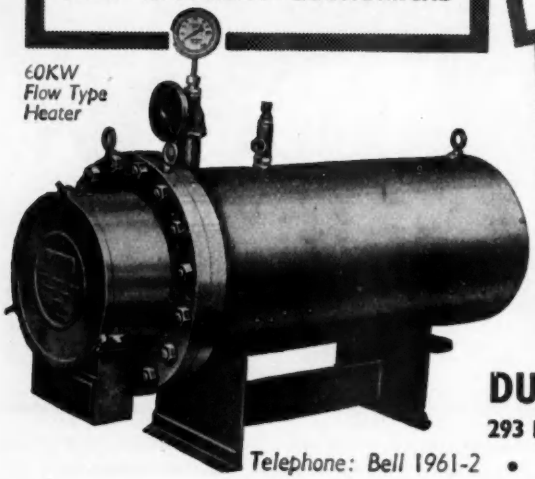

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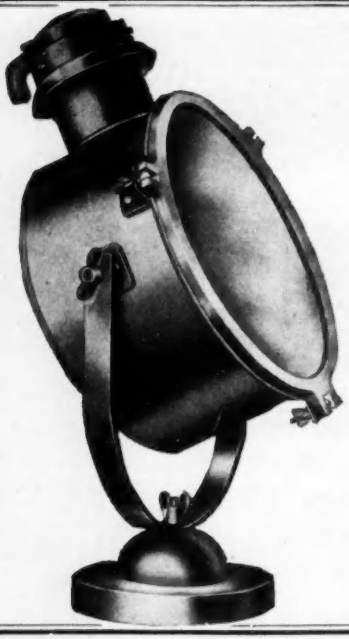

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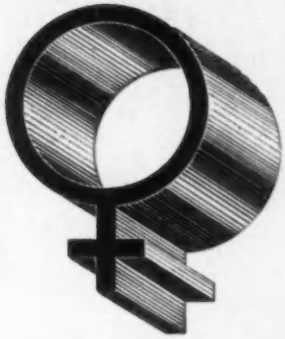

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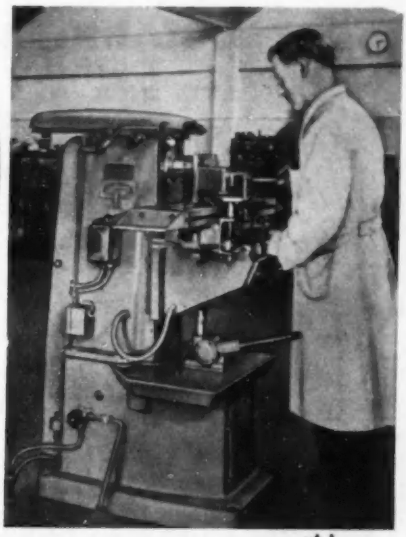

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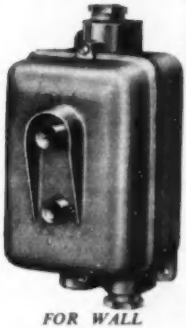

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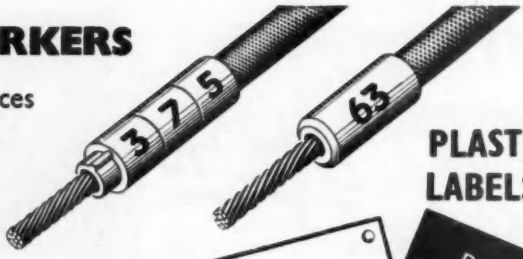

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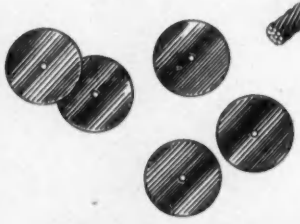

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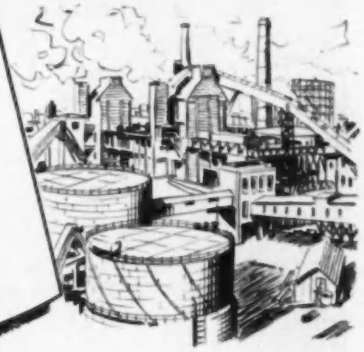

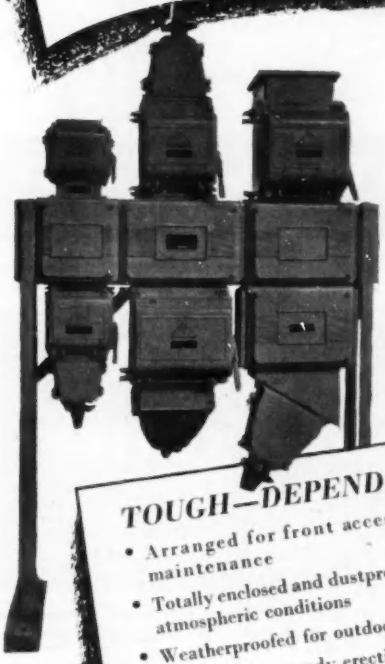

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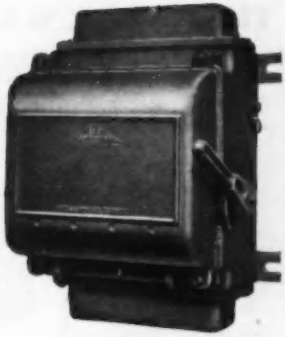

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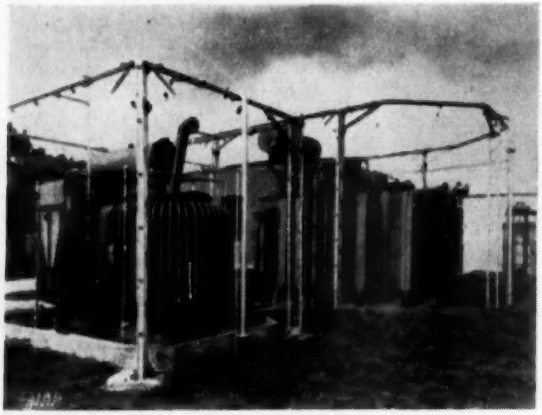

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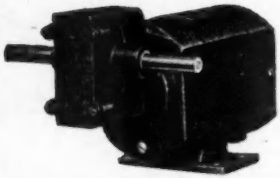

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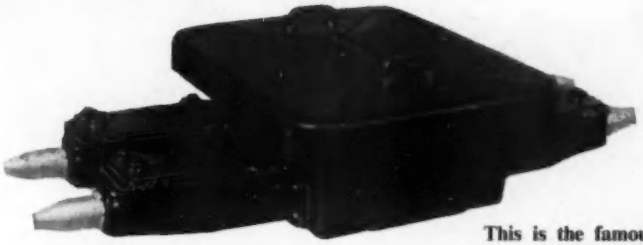

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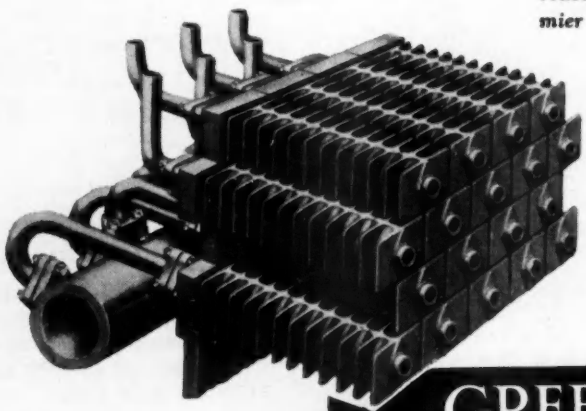

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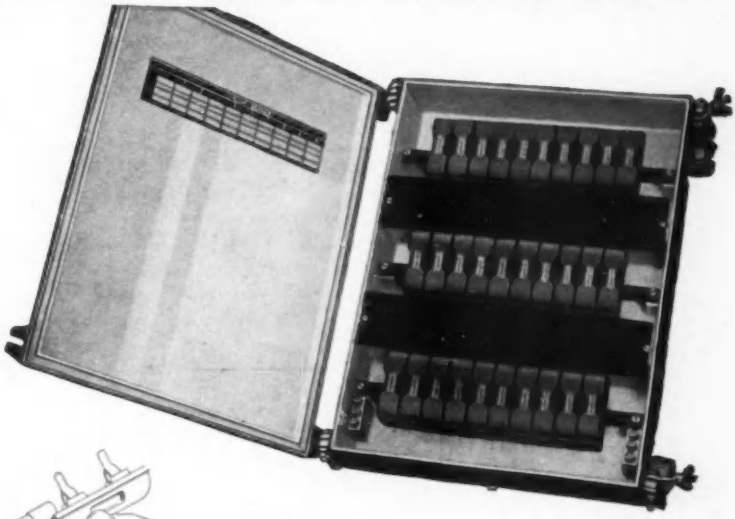

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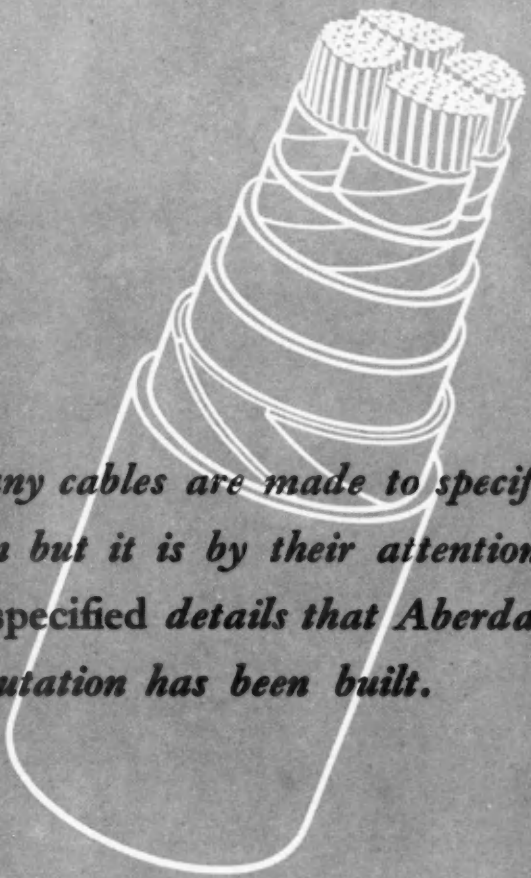

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